


311.4-634

7 January 1991

TO: Distribution

FROM: Randy Cassingham 

SUBJECT: Space Station Team Meeting Minutes for 7 January 1991

PRESENT: Paul Henry, Randy Cassingham, Richard Grumm, Charles Ivie

Next Meeting: 14 January 1991 at 10:30 in 301-169

Paul Henry

Happy new year, all. Rob is out on travel today.

Rob has been tasked by JSO to identify the JSO people who were particularly helpful in recent Space Station work. This will be helpful in a "pre-090" exercise to try to get the best people work on Lab, rather than laying them off. (Several of the JSOers, however, won't go either way: half a dozen or so will likely be assigned as Headquarters detailees.) Anyone with particular kudos for specific JSO personnel should contact Rob.

The OSSI review scheduled for Thursday has been rescheduled for next Friday (the 18th) from 8:45-noon in 180-903. Rob will issue an agenda.

Rob received a copy of a memo to the Associate Administrator for Space Flight (Code M) from the Associate Administrator for Aeronautics, Exploration and Technology (Code RS) regarding the Station restructuring activity. It outlined several "principles" that RS believes "NASA should follow when deciding upon the redesign of SSF." The principles are: "1. The design should not preclude future expansion in structure, power and crew size to enable its evolution into a transportation node such that it could serve as an interplanetary spacecraft assembly, maintenance and resupply facility. 2. Life sciences research involving humans is one of the highest priorities in the Exploration Technology Program. No final commitment to long duration, manned interplanetary missions can be made until the effects of weightlessness on humans are adequately studied and documented. Therefore, provisions for long duration human occupation of Space Station Freedom at an early date are extremely important."

In another memo, to the Deputy Director of Space Station Programs and Operations (Code MS) from the Deputy Director of the Flight Systems Division (Code SM) regarding the impact to OSSA of the PDR Resources Team decisions, several interesting points were made in several areas. Under "Resource Reduction Themes", it was noted that "the directive that all functions supporting operability of individual payloads be zero fault tolerant seriously threatens successful utilization of the Station by OSSA. ... Zero basing instrumentation to characterize system performance on-orbit will tend to preclude critical monitoring activities which we believed were still the subjects of responsible discussion and negotiation between OSSA and SSFP. ... Defining the user interface at the rack-to-Station boundary for internal payloads, and at the Station Interface Adapter and the Payload Interface Adapter for external payloads, is acceptable to OSSA, provided that power and thermal resources for SSFP-provided components now charged on the user side of these interfaces be transferred to augment the 30 kw available to users. Shifting the interface boundary to solve a systems resource problem does not provide NASA with a solution - it just transfers the problem to users and further

dilutes our own restricted power resource." Several other points are made under the headings "Resource Reduction Decisions" and "Approved Resource Reduction Items", and concludes with a listing of specific actions that OSSA requests of the Program.

The Integrated System Preliminary Design Review has been completed. Deputy Program Manager Robert Moorehead told the press "Not only did we accomplish the PDR on schedule, we made the schedule despite having to devote a lot of time and attention to other issues, like weight and power and EVA resources." After "an intensive summer-long resources scrub", the Station's weight is only 13,000 pounds over the allocated (512,000 pound) limit, and housekeeping power, which had been 15 kw over the 45 kw available, was trimmed by 13 kw, leaving users with about 30 kw.

The Spacelab to Space Station Freedom Transition Study Report No. 3: The Utilization of the Drop Physics Module for Early Man-Tended SSF Flights report has been issued.

Paul is starting work on the development of utilization policies for the Level I utilization office (Code MUU). As examples, Paul noted policies of entry into the Program by new users and those related to combining the Consolidated Operations Plan and the Consolidated Utilization Plan into the COUP – the Consolidated Operations and Utilization Plan. Dick Grumm had a few comments on this: the containerless processing facility is not much affected by microgravity disturbances; therefore, they list their microgravity requirements as 10^{-3} to 10^{-4} . However, headquarters routinely changes the requirements to 10^{-5} in order, Dick thinks, to standardize the requirements across the board (other payloads must have 10^{-5} to operate properly). Because the current process limits user input and tracking, Dick is afraid that the containerless processing facility might be excluded from operation in certain flights because of the perceived requirement that they must have a 10^{-5} environment when they really don't – "oh, we'll only have 10^{-4} on this flight, so let's scratch the containerless folks". Dick thinks users will suffer unless they have the chance to track the progress of their payload through the COUP process and provide input in the form of requirements rationale during the COUP's creation.

No activity was reported for SDTM, MESSOC, FAST, CAT or FROST development.

Upcoming Meetings

January 7: AIAA meeting in Reno (paper on Space Station Environmental Effects to be presented). Hank Garrett and Gerry Murphy to attend.

January 15-16: User Operations Working Group meeting in Huntsville. Hershal Fitzhugh to attend.

January 10 (new new date): Review of all OSSA-related Space Station work that relates to OSSI in room 180-903, 8:45-noon.

January 25: Communication System Engineering Panel (CSEP) meeting in Reston. Bob Aster and Chuck Ivie to attend.

January TBD: Space Station Grounding Tiger Team meeting in Reston. Phil Leung and Gerry Murphy to attend.

August 6-8: Second Evolution Symposium: "Beyond the Baseline '91" at the South Shore Harbour in League City. Paul Henry and Jeff H. Smith to attend.

Recent Space Station-related items from Code P's "Daily News in Brief" (Typos *not* corrected...)

Los Angeles Times -- 12/25/90

"NASA PUTS CHANCES OF SPACE STATION EVER REACHING ORBIT AT ABOUT 50-50 By Robert Stewart

"It was to have been NASA's crowning achievement at the end of this century -- a gateway not only to Mars and beyond but to the next millennium."

The Times says that Space Station Freedom -- an orbiting Erector Set of habitation modules and shimmering solar panels suspended from a giant metal truss -- was designed as a launching pad for interplanetary exploration, for a pioneering laboratory for studying the effects of space and gravity, and was also a boon to aerospace contractors, particularly McDonnell Douglas Space Systems, of Huntington Beach, and Rockwell International's Rocketdyne Division, in Canoga Park, both of which together, the Times says, have contracts worth \$6 billion.

But, according to the story, last Fall an unprecedented budget deficit axe fell -- taking with it about \$6 billion of space station funds over the next six years. Now, the Times says, the contractors, including Boeing, of Seattle, and General Electric, of Philadelphia, are in a scrambling mode to hang on to whatever pieces of Freedom they can and are acting as if the bidding process has been opened anew.

The Times quotes the executive director of the space policy Space Foundation thinktank, Jeffrey Manber, as saying "people perceive correctly that the station design is open again, so everyone is running in to try to present their ideas on how to lead the program."

The paper quotes space station program officials as saying the program has a "better than 50-50" chance of reaching orbit but will be delayed and dramatically scaled back. The paper says there are conflicting mandates on how to scale back the station and quotes NASA Space Flight chief Bill Lenoir as saying NASA has "a lot of options on the table and is mixing and matching" trying to put things back together but still "has a lot of balls in the air."

The Times summarizes its reporting on this item by quoting an unnamed Capital Hill strategist as saying this is NASA's last and best chance to save the program but "they've got to do it right."

The New York Times -- 1/1/91

"DISABLED SOVIET CRAFT PLUNGING BACK TO EARTH" By William J. Broad

"With rescue plans in tatters and all control apparently lost, an abandoned 40 ton Soviet Salyut 7 space station will plunge to earth in a rain of fiery debris in the next few weeks, experts on the Soviet space program said yesterday."

According to the Times, Tass officials say parts of the flaming craft may reach the surface.

Intense solar activity exacerbated the orbital decay of the station, once expected to remain in orbit until 1994, says Broad's story.


The reentry time and date remain unclear with Tass saying it was likely to fall in February, reports the Times.

The Times notes the unlikelihood of parts of the station striking inhabited areas, quoting Teledyne Brown's Nicholas L. Johnson, "The statistics show you're much more likely to be hit by lightning."

311.4-636

14 January 1991

TO: Distribution

FROM: Randy Cassingham 

SUBJECT: Space Station Team Meeting Minutes for 14 January 1991

PRESENT: Rob Staehle, Randy Cassingham, Henry Kleine, Richard Grumm, Bob Aster, Hershal Fitzhugh, Paul Henry

Next Meeting: 21 January 1991 at 10:30 in 301-169

Corrections to last week's minutes...

- It was reported last week that Rob was "tasked by JSO to identify the JSO people who were particularly helpful in recent Space Station work". This was not the case. Sorry for this misinterpretation.
- A typo incorrectly listed the date for the Review of OSSI-related Space Station work that relates to OSSI. This review is in fact set for this Friday, January 18. More on this below.

Rob Staehle

NASA Administrator Dick Truly received a letter from Caleb Hurtt, the new Chairman of the NASA Advisory Council, summarizing the highlights of the November 29-30 NAC meeting. Highlights of these highlights, from several NAC task forces, follow:

- **Public affairs Task Force:** [A report concludes that] "NASA has been unsuccessful at communicating the importance of its programs for the lives of ordinary people. [The report] attributes this failure to the agency's lack of communications expertise and reliance on the political support of the 'choir' of space enthusiasts. The report recommends that NASA take a marketing approach toward its public information program...."
- **Space Science and Applications Advisory Committee:** "From the perspective of SSAAC and the Office of Space Science and Applications (OSSA) program, the primary purposes of Space Station Freedom, in priority order, are: [1] to make a major advance in human space exploration by providing a long-duration, continuously habitable spacecraft in low Earth orbit, a) for studying and enhancing the performance of humans in space, and b) for testing and improving habitation systems; [2] to enable a major advance in space laboratory research, by providing a continuously operated laboratory for basic scientific and applications research requiring human interaction; and [3] to support space observation research, by providing a space observing platform for experiments requiring very long observing times, yet frequent accessibility. Accordingly, failure to reach the permanently manned phase in the restructured Space Station Freedom program would result in failure to achieve the Freedom station's priority-one purpose. The committee is also concerned that the needs of the international scientific community be well represented in the fast-paced 90-day study, and that accommodation for laboratory research, regardless of discipline, not be abandoned. Quality, rather than quantity, should govern laboratory accommodations."
- **Space Station Advisory Committee:** "The Council's Space Station Advisory Committee (SSAC) has been working closely with the Space Station Freedom program office. Its subcommittees on Space Debris and EVA Maintenance and Robotics have reported findings and recommendations directly to the program director. [The Chairman] highlighted some of the committee's findings: [1] systems verification before launch of the Freedom station's elements, systems and subsystems should be an influential element in the establishment of interfaces

and in the criteria for ground test articles and facilities; [2] experimentation during an initial "man-tended" phase offers an opportunity to conduct exploratory microgravity research in an environment undisturbed by the presence of people. The earlier that space experimentation data can begin flowing from the Freedom station, the more likely it is that the public and the Congress will continue supporting the program; [3] every effort should be made during restructuring and any subsequent redesign to minimize the need for maintenance outside the pressurized volumes; [4] it is necessary to understand fully the relationship of the various robotic-teleoperated devices now planned in Freedom station's assembly and maintenance to assure that there is no unnecessary redundancy among them; [5] the committee believes that the initial design of the Freedom station did not sufficiently emphasize component and subsystems commonality across the total station; the restructuring process provides an opportunity to revisit the hardware and software commonality issue; [6] though as much component and subsystem design work as possible should be retained, items encountering difficulties and/or schedule and cost problems should be reconsidered; and [7] the long-term usefulness of the Freedom station as a research and development laboratory would be enhanced by involving the non-NASA user community in reestablishing requirements for experiment accommodation. The SSAC strongly endorses the work of the Space Station Science and Applications Advisory Subcommittee in coordinating activities between NASA users and non-NASA users during the restructuring period."

The official report of the Augustine Commission, "Report of the Advisory Committee on the Future of the U.S. Space Program", has been issued. Rob has a copy, if anyone would like a photocopy.

Phil Cressy distributed his notes from the Space Station Restructuring Meeting, held on 1/4/91. Highlights include:

- "Moorehead said his direction was that he had no milestone after PMC [Permanently Manned Capability]. This would imply that any growth we expected between PMC and AC [Assembly Complete] is no longer the subject of discussion in the Restructuring study. ... Moorehead said he did not want to [perform] quality tests at the component level, that testing at the engineering model level is more what he had in mind, and that he felt strongly enough about it to get the component level approach out of the program fast."
- "A partner meeting (no other info) will be held 1/14. On 1/15, PDR and Restructure reviews will be given to Lenoir. If all goes well, then will come presentations to Truly, OMB and Congress."
- "WP-01 noted that they do not plan to qualify hardware to ensure operation in 'reduced or zero pressure'. At the extreme, for example, that could require an item now planned to be cooled by avionics air only to (also) have cold plate cooling."
- "The safety folks stated that there was no safety requirement for a closed module pattern, although convenience and crew preference support closure. Argument seemed to be that in worst case scenario of a 4" diameter hole (caused by a 1 cm particle; see, they *do* use metric), resulting air flow will still permit safe egress from Lab B or Hab B without closure."
- "I think they have finally agreed, after much discussion, to accept the Turbo decision for DDCU's to go inside, not outside, the modules. (The) cost impact is only \$3M."
- WP-02 discussed the proposed hyperbaric airlock deletion, (citing) the 2% probability of medically serious decompression per EVA per person (leading to 1-2 events per year), and concluded that for \$20M, it wasn't worth deleting. WP-02 also recommended going right to FDDI [fiber optics] and deleting 802.4. ... (The) most serious issue seemed to be a proposed deletion of Ku-band uplink, limiting users to 72 kbps S-band -- maybe sufficient for slow-scanned images, but totally inadequate for (full motion) video. I stated strongly Life Science's need for uplink video after PMC for 'coaching', but Moorehead isn't really interested in post-PMC." (At hearing this last item, Dick Grumm noted that he had heard a rumor that the Ku-band downlink was also deleted, seriously limiting the return data flow; he will check into this further).

The OSSI Space Station review is on for Friday from 8:45-noon in 180-903. Rob has issued an agenda for the meeting. Dick Laeser and/or Bob Easter will attend.

Dick Laeser and Bob Easter also expect to attend next Monday's Space Station meeting to discuss the JSO closeout.

The Communications Analysis Team's paper "Analysis of Network Interface Unit Bandwidths" was released to Level II on January 9.

Bill Byrd has been appointed as acting manager, Space Operations Office, by Michael Hawes/MSU. This was Hawes' former position before he became acting head of MSU, succeeding John Cox.

A change request to the PDRD, "Change to Factors of Safety Table 3-3", has been issued. Rob will route it to Section 521 for review. Comments are due to the SSCB by February 13.

Stan Krauthamer received a letter from the British Interplanetary Society thanking him for reviewing a paper submitted to them, "Allocating Power to Schedule Loads and Chart Batteries on the Space Station". The author, T. Sheshkin, has reportedly incorporated all of Stan's comments, and the paper is being readied for publication.

The Navy has released a 34 minute video of the "portrayal of the fundamentals of Satellite Operations... with the purpose of providing a concise visual description of the basic principles affecting the launch, orbit, operation and use of satellites." The video should be available through Rob.

Last week, Rob presented a paper at the University of Arizona Symposium on Near-Earth Resources on Lunar Base Siting. Rob and his co-authors (Jim Burke/313, Gerry Snyder/313, Richard Dowling/World Space Foundation and Paul Spiadis/Lunar & Planetary Institute) were able to tour through Biosphere II near Oracle, Arizona. He found the Biosphere project very interesting, and of possible long-term interest to NASA. Of particular note was a working prototype track gas analysis system, designed to automatically monitor the internal atmosphere in several locations, warning of contaminant buildups and providing clues regarding ecosystem health. Early this year, eight people will be sealed in the Biosphere for two years.

Dick Grumm

Dick has heard disturbing reports regarding the Station's reduced data downlink capabilities and asks that Bob Aster bring back some clarifying information from next month's Communication System Engineering Panel (CSEP) meeting in Reston.

Henry Kleine

Joe Younger has now quit the Lab, in favor of a better position in Canada. A new programmer, Chris Roach, has replaced him, but it will take a month or so to get him up to speed, both on the workstation and the FROST software.

The SNAP -- the Static Network Analysis Preview -- concept paper is in draft form and has been sent out for comments. The final version should be issued soon.

Hershal Fitzhugh

A Science Utilization Management telecon was held Thursday. Several *rumors* were discussed, including: life science activities will be reassigned from OSSA to Code Z; OSSA will continue with microgravity activities, but payload integration will move to Code SN and SM. Fitz thinks the SUM team itself will be reorganized, no longer under Code SM's purview.

EXOICE has received funding to prepare a management plan which will serve as a model for other small experiments. Mark Sistilli/SM has released money for Peter Tsou's EXOICE work.

Kristan Lattu has moved from Space Station to work on the Wide Field Planetary Camera, effective last week.

Communications Analysis Team (Bob Aster)

CAT delivered seven items last week:

- A FROST test report (Govind Deshpande); one function was found to be defective in the Sun environment, other basic functions were found to work well,
- An STS Information System Component List (Jerry Olivieri),
- STS Information System Block Diagrams (Jerry Olivieri); this, and the previous item, provide necessary background for analysis of a restructured Space Station information system with some "Shuttlized" components,
- Data Flow Diagrams, with Functional Descriptions (Chuck Ivie); these generic diagrams represent the beginning of the process of coupling analysis with the redesign of the Space Station,
- A Design Opportunity List (Chuck Ivie); describes how "Shuttlization" and other restructuring options might benefit the Station,
- Latency Estimates for the IS-PDR Architecture, (Bob Aster, James Michael DePitahaya and Govind Deshpande); describes the best available latency data from various sources, which does not reflect a rigorous analysis in many instances. A campaign of end-to-end system analyses is needed in order for latency estimations to really be valid, and
- Some minor WPA modifications were made this week. All schedules are being met at this time.

Several deliveries are expected to be made this week:

- FROST object identification for the restructured architecture,
- Partial parameterization of the FROST objects, and an update of the FROST object library,
- A mapping of the data flow diagram elements into alternative restructured architectures in order to support the above activities (which requires some input from JSC people, who have been quite cooperative), and
- A list of operational consequences of restructuring Space Station Freedom along the lines presently understood by the CAT.

Long term goals of CAT are:

- To develop initial estimates of latency of restructured architectural options, and
- Either develop new funding relationships with the Space Station Freedom Program, or document work in progress as of April 1 and stop work.

Paul Henry

Paul has received approval from Remer Prince/MUU for his statement of work for this year's Level I Utilization Support task. He will work up a new SRM this week. He is also working on a new SRM for the EWG support effort.

Paul reported on some "interesting tidbits" he picked up while researching the accommodations of the JEM Exposed Facility. NASDA confirms that there are a lot of TBDs in the EF's accommodations. There is a meeting scheduled for 1/31-2/1 in Japan, and an OSSA/NASDA meeting on 2/4, that will try to bring more clarity to user requirements issues. ESA, for one, is quite eager to use the EF. (Fitz commented here that NASDA had considered dropping the EF, but Robert Rhome/S asked them not to – the U.S. wants to use it too.) Paul also talked to Mark Sistilli/SM concerning attach payloads on a restructured Station. He said it was unclear as to how attached payload would be handled, if indeed they would be included on the restructured Station.

No activity was reported for SDTM, MESSOC, external environment, or robotics tasks.

Upcoming Meetings

January 18: Review of Space Station work that relates to OSSI in room 180-903, 8:45-noon.
January TBD: Space Station Grounding Tiger Team meeting in Reston. Phil Leung and Gerry Murphy to attend.
February TBD: Communication System Engineering Panel (CSEP) meeting in Reston. Bob Aster and Chuck Ivie to attend.
August 6-8: Second Evolution Symposium: "Beyond the Baseline '91" at the South Shore Harbour in League City. Paul Henry and Jeff H. Smith to attend.

Recent Space Station-related Items from Code P's "Daily News in Brief" (Typos *not* corrected...)

New York Times -- 1/8/91

"SOVIET WOES TARNISH ONCE-SHINING SPACE EFFORTS" By William Broad

"The Soviet Union's space program, the largest and most active in the world, is starting to crack under the crushing weight of political and economic troubles."

The Times' space reporter notes that the signs of stress abound from the lack of humans flying in the Soviet shuttle to delays in the U.S.S.R.'s launch schedule to the expected flaming reentry of the now-abandoned Salyut-7 space station.

The story also reports that plans for expansion of the Mir space station have suffered repeated setbacks and curtailments and the actual occupation of the station by cosmonauts even lapsed for four months in 1988.

The Times reports that the Soviet program is so hungry for cash that their officials are now even willing to sell space nuclear power generators to any takers -- including the United States Government.

The paper reports that officials here in the U.S. are beginning to suggest that the monolithic Soviet space program may give way to a set of smaller, independent space programs managed by a variety of organizations, each associated with either the nationalistic Soviet government or one of the regional republics like Russia.

The paper reports that space analyst John Pike, of the Federation of American Scientists, said the Russia Socialist Republic recently launched its own communications satellite and plans to operate it independently of centralized Soviet control.

The story relates the assessments of a variety of recognized American space experts whose skills lie with analyzing the Soviet program including Marcia Smith of the Library of Congress, James Oberg of Johnson Space Center, and Nicholas Johnson of Teledyne Brown, and concludes that the experts predict very hard times now and for the foreseeable future for the Soviet space program.

New York Times -- 1/9/91

"ASTRONAUT, QUITTING NASA, URGES OVERHAUL OF SPACE STATION" By William Broad

"An astronaut who is resigning from NASA warned yesterday that its planned \$37 billion space station could be canceled outright if its redesign, now under way, was superficial."

The Times reports that astronaut Dr. William Fisher, who led a study which found that the 500 foot space station structure would need up to 3,700 hours of external maintenance, warned in an interview with the paper that a "business as usual" approach to the space station could ultimately fail as its cost kept increasing.

"NASA should take heed of the A-12," the Times quotes Fisher as saying, referring to the recently cancelled Navy stealth carrier attack fighter program which was propoorted to cost over \$57 billion.

"Here was a project that came in behind schedule and over budget that doesn't exist anymore. It's not beyond the realm of possibility that this could happen to the station if it turns out we don't have a viable design," the paper quotes Fisher, again, as saying.

Although the Times reports that Fisher gained notoriety last March when his report accused NASA management of overlooking problems with the station, the Times says Fisher's resignation was not the result of any political pressure. Rather, the Times reports the astronaut was ready for a change.

Associated Press -- 1/11/91

"BACK TO THE DRAWING BOARD" By Harry Rosenthal

"The National Aeronautics and Space Administration said Friday it will go back to the drawing board to design a simpler, less costly space station as recommended by a panel of experts."

The AP says that NASA Administrator Richard Truly announced the new review less than a month after the completion of a yearlong reassessment of the space station design because the Advisory Committee on the Future of the U.S. Space Program recommended that the station be reconfigured to "reduce cost and complexity."

The story says that Truly also indicated that space science would remain as NASA's priority and that NASA would study jointly with the Air Force a new booster rocket.

The wire service quotes Truly as saying "these efforts will provide us with the solid foundation of information needed to make well-informed decisions in order to implement other advisory committee recommendations, all of which we take very seriously."

The wire service says that Truly pointed out that some of the Advisory Committee's recommendations require White House or Congressional action and some depend on sufficient funding being made available.


JET PROPULSION LABORATORY

INTEROFFICE MEMORANDUM

311.4-644

21 January 1991

TO: Distribution

FROM: Randy Cassingham 

SUBJECT: Space Station Team Meeting Minutes for 21 January 1991

PRESENT: Rob Staehle, Randy Cassingham, Bob Easter, Paul Henry, Chuck Ivie, Richard Grumm, Henry Kleine, Bob Aster, Chet Borden, George Fox, Jeff H. Smith, Robert Shishko, Chris Roach, Gerry Murphy, Hershail Fitzhugh

Next Meeting: 28 January 1991 at 10:30 in 301-169

Bob Easter

Bob Easter/JSO, here for the Director's Review and Discussion meeting here this afternoon, summarized the Program now that the Station's 90-day restructuring effort is completed. (Randy Cassingham has a copy of the viewgraphs he will be presenting at the DRD; call if you would like a copy.)

While the 90-day restructuring effort -- required both by Congressional directive and Congressionally imposed Program budget limitations -- is complete, Lenoir is not completely satisfied with the results; the budget still isn't as balanced as he would like, so more adjustments may be forthcoming. In summary, it has been decided to go with smaller Lab and Hab modules -- 27 feet, down from about 44 feet -- which will allow pre-integration on the ground, and a shorter, pre-integrated truss -- making the Station's overall length about 350 feet, down from about 493 feet. Permanently Manned Capability (PMC) will not occur until the 16th assembly flight (in the meantime, there will also be six utilization flights); at PMC, the crew has been reduced to four from eight, power has been reduced to 37.5 kW total, and the data rate has been reduced to 50 Mbps. The smaller modules make for less rack space: about 14 user racks will be available at PMC. The time span in the "Recommended Launch Manifest" from First Element Launch to Man-Tended Capability (MTC) is only about seven months -- and after six assembly flights. JSO, however, thinks MTC will slip somewhat. The Assembly Complete phase has also been stretching further into the future: that 34th assembly flight will not occur until the year 2000. It is not clear that the "Assembly Complete" milestone is regarded as "real". All international hardware will be up by PMC.

There are several positive aspects to these changes. The ground-based integration will mean much less on-orbit assembly and servicing time. Also, by PMC, all Partner-supplied elements will be on-orbit, rather than being slipped to some post-PMC time period, as before. (Rob Staehle pointed out that even with the reductions in the Station's resources, the PMC Station will be much better equipped than the Soviet *Mir* station, which has been producing good science -- we'll find a way to get good science out of ours, too.)

Bob is somewhat concerned regarding the increased reliance on the Shuttle (there has been little discussion so far regarding ELVs; this may be revisited in the future) and the increased use of Shuttle components (e.g., for the communications and tracking system and for life support). The shorter truss length may mean increasing problems with plume impingement and contamination from the Shuttle (the photovoltaic panels will be closer to the modules -- and thus the Shuttle). Currently, the Assured Crew Rescue Return Vehicle is still not completely defined, and reliability and maintainability needs further study.

The JSO "resignation" from the Program office, which was accepted by Lenoir, is proceeding in an orderly fashion as planned. The schedule for phase-out of JSO-sponsored tasks is nearly

completed. The schedule appears to be holding as described last year. So far, one JSO person has accepted a detailee position with Code O at NASA HQ. Much discussion is ongoing about other possible detailee positions. Rob Staehle, and many of the divisions, have resumes of those being displaced by the JSO shutdown. [In the DRD meeting, Ed Stone made it clear that special efforts should be made to place those JSO people back in Pasadena who want to return.]

Rob Staehle

There was an OSSA review of Space Station tasks last Friday, focussing on what JPL wants out of the Station (short answer: microgravity facility and EXOICE, and, in the future, tech demonstrations and large instrument deployment). Bob Easter, Dick Grumm, Hershal Fitzhugh, Kristan Lattu, Bob White and Paul Henry made very good presentations.

OSSA has released its "Science and Applications Utilization Requirements for Space Station Freedom". OSSA notes that "the requirements summarized in this document will serve as the science baseline against which to measure impacts from proposed changes to the Space Station Freedom Program, offer a consolidated view of science user requirements, and provide insight into the basis for such requirements".

The annual "report card" on JPL (where NASA HQ management summarizes and rates each NASA Center on its activities for the year) has been released. JPL's Space Station efforts fared quite well, including FROST. It was noted that "the numerous reports, studies, and plans resulting from the multiple activities of JSO were organized and timely." It was also noted that "the contribution of JSO to the Space Station Freedom program has proven to be invaluable, particularly in the ISPDR activities, the development and utilization of ARMS, and the technical assessment of critical Program issues."

Rob has a videotape copy of the summary of the Augustine Commission briefing and Truly's response. He will lend it on request.

Did you know that the Space Station *Freedom* Program has a historian? Dr. Adam L. Gruen (FTS 453-8757) is the director of the Space Station History Project, a contract that started in November 1985 to record, research, document and write the history of the Program.

Dick Grumm

Dick reiterated for Bob Easter his concern about MCPF "requirements" being overly filtered by OSSA, making it appear that microgravity experiments cannot be accomplished using MCPF, when in fact they could be. Dick feels useful science could be performed under ground control while no crew is aboard during the MTC phase, but it is unclear if even a minimal communications and control capability is being considered to enable this sort of experimentation.

Communications Analysis Team (Bob Aster)

CAT is slipping one deliverable -- the object library -- for a few days. This will not be much of a problem since the Communication System Engineering Panel (CSEP) meeting in Reston has been slipped for about a month. In the meantime, the WPA has been signed off and Bob Aster will be working on obtaining new sponsors. Bob is concerned about this slippage of the CSEP meeting as it has delayed ongoing contacts with potential new sponsors.

Chet Borden

With George Fox/311's help, SDTM is progressing on schedule to finish the agreed upon deliverables by the end of June. Orin Merrill/JSO will be here next week to discuss the task. Orin has been working with the Level II Program Engineering Office to transfer SDTM responsibilities.

Henry Kleine

Henry is still working to bring the new FROST programmer -- Chris Roach -- up to speed on the Sun workstation. Funding should be adequate to run the task to the end of September. In the meantime, DSN, and possibly others, have shown interest in providing support for the task. Henry introduced Chris at the meeting.

Bob Shishko

The final version of MESSOC 2.2 (Method for Estimating Space Station Operations Costs) has been delivered to Greg Williams/MSU. This was MESSOC's final delivery, but Bob hopes to get more funding for further work. MESSOC would be quite helpful in the study of operations for the new Station redesign, especially considering various reductions in ground support.

Jeff H. Smith

Jeff reported he may be providing some short-term support to SDTM, but is otherwise no longer performing Space Station tasks.

Gerry Murphy

Last Monday, Gerry made a presentation on grounding issues at the grounding "Tiger Team" meeting. John-David Bartoe/MU also discussed some of the issues with Gerry. The Team is quantifying the various risks involved to enable engineering assessments on grounding issues such as sputtering, photovoltaic panel arcing, vehicle charging, etc. Gerry thinks these issues have not yet received the attention they deserve from top management; some of the problems could be quite severe. He feels the technical people concerned do have an appreciation of the problem, but that these problems are "lost in the noise" at top levels.

Gerry indicated that Bob Laskin/343 had completed work for now on disturbance simulation modeling. With the higher priority on microgravity science, the Program "should" be more interested in this capability next year.

Upcoming Meetings

February TBD: Communication System Engineering Panel (CSEP) meeting in Reston. Bob Aster and Chuck Ivie to attend.

August 6-8: Second Evolution Symposium: "Beyond the Baseline '91" at the South Shore Harbour in League City. Paul Henry and Jeff H. Smith to attend.

Recent Space Station-related items from Code P's "Daily News in Brief" (Typos *not* corrected...)

Space Fax Daily -- 1/22/91

"BRITONS TOLD TO GET OUT HARDHATS FOR SALYUT-7"

"Britain's Ministry of the Interior stated Friday that there was a slight possibility that the country could get hit by falling debris from the abandoned Soviet Salyut-7 space station when it reaches full orbital decay and comes plunging through the atmosphere next month."

The newsletter reports that the British ministry thinks the 40 ton satellite will reenter around Feb. 8, plus or minus ten days.

Space News -- Jan. 21-Feb. 3

"LARGE NASA INCREASE SOUGHT" By Andrew Lawler

"U.S. President George Bush will ask Congress to give NASA a 13 percent increase in 1992, according to administration officials."

The weekly reports that the \$15.7 billion request will include a hefty boost for the agency's science program and new launcher development and a modest increase for space station.


JET PROPULSION LABORATORY

INTEROFFICE MEMORANDUM

311.4-645

28 January 1991

TO: Distribution

FROM: Randy Cassingham 

SUBJECT: Space Station Team Meeting Minutes for 28 January 1991

PRESENT: Rob Staehle, Randy Cassingham, Paul Henry, Richard Grumm, Bob Aster

Next Meeting: 4 February 1991 at 10:30 in 301-169

Rob Staehle

A detailed closeout plan for JSO activities has now been finalized. Bob Easter is preparing a summary report of all of JSO's past activities (lessons learned, etc.) -- anyone having a strong desire to make inputs should contact Rob.

NASA and the National Science Foundation have signed an agreement to use NSF's base in Antarctica as a testbed for technologies and systems to prepare for manned flights to Mars and permanent facilities on the Moon. Life support and environmental control, energy generation and storage, automation and robotics, telescience, and human behavior and performance will be emphasized.

Henry Kleine has arranged for Felicia Sanders, one of the FROST programmers who left for another job recently, to come back for a short time to help get Chris Roach, the new programmer, up-to-speed on FROST and the Sun workstation.

Jim Hendrickson/354 will review the recently issued change request to the PDRD, "Change to Factors of Safety Table 3-3".

The "Catalog of JPL System Engineering Tools and Models (1990)" has recently been published. It was compiled by Bob Shishko/311, who has extra copies for anyone who needs one.

Communications Analysis Team (Bob Aster)

Several deliverables were met last week:

- The FROST Object's were identified, and a partial set of data for each object was delivered January 24. The electronic version of the Library is being updated, and will be delivered this week. A User's Guide will accompany the electronic version.
- Received comments from JSO on the Flow Control Study on January 22; the comments will be incorporated, and the final document delivered, this week.
- Bob will be travelling to Reston this week to listen to Level I Program Engineering describe plans for future evolution of the Station, and to discuss new funding possibilities.

Chuck Ivie and Jerry Olivieri are at JSC this week to observe the Shuttle Mission Control Center during a simulated Spacelab operation, to get review comments on the FROST Objects, and to obtain other available information related to the restructured information system architecture.

Due to the JSO closeout, two members of the Communications Analysis Team will be reduced to half time in February as planned. Further reductions in staffing will occur at the end of February.

Mike Devirian/JSO was in Pasadena last Friday and was briefed on the status and plans of the Communications Analysis Team.

Dick Grumm

The Intercenter System Engineering Team (ISET) meeting will be held at JPL this time around (it circulates among the Centers). It will probably be held in March. Dick suggests that a day be spent at McDonnell Douglas to promote more direct contact between users and the work packages and to discuss the many upcoming changes in the restructured Program.

Dick is trying to set up a meeting with the Customer Utilization Office at MSFC to discuss Boeing's use of RDD -- Requirements-Driven Development, a commercial requirements tracking tool. The package is in extensive use at Boeing, and Dick thinks it would be helpful to use in the Space Station Program.

Paul Henry

Paul is ready to start work on the development of utilization policies for the Level I utilization office (Code MUU), and is waiting for a go-ahead from Barry Epstein. He hopes to meet with Margaret Herring/NA to discuss what form the policies should take (NMI, Program Directive, etc.). Paul is also trying to obtain funding to continue the Evolution Working Group support, but is not sure whether or not JPL will be given funding to continue its involvement.

Upcoming Meetings

January 31: FROST meeting in Reston. Bob Aster to attend.

February TBD: Communication System Engineering Meeting in Reston. Bob Aster and Chuck Ivie to attend.

March TBD: Intercenter System Engineering Team (ISET) meeting, to be held this time at JPL. Dick Grumm to attend.

August 6-8: Second Evolution Symposium: "Beyond the Baseline '91" at the South Shore Harbour in League City. Paul Henry and Jeff H. Smith to attend.

Recent Space Station-related items from Code P's "Daily News in Brief" (Typos *not* corrected...)

Associated Press -- 1/26/91
"SOVIET SPACE"

"Two Soviet cosmonauts spent more than six hours on a spacewalk outside their orbital station Saturday, completing the installation of two hoists on the outside of the complex, Soviet media reported."

The AP's Moscow bureau reports that the two cosmonauts assembled telescopic booms which will be used to transfer solar batteries from one part of the space station to another.

The story says the cosmonauts, Viktor Afanasyev and Musa Manarov, were working under relaxed flight control rules which did not impose any strict time limits on their work. The story says the crew managed to complete all the tasks assigned to them, in marked contrast to the troubled spacewalk last July by cosmonauts Alexander Solovyov and Alexander Balandin.

Washington Post -- 1/26/91

"NASA OFFICIALS WEIGH TAKING MAJOR FACILITY FROM RESTON By Kent Jenkins Jr.

"In a move that could cost Northern Virginia more than 1,000 jobs and a prominent high tech employer, NASA is considering whether to relocate a Reston facility that manages the nation's \$20 billion space station program."

The story says that NASA, under orders from Congress to overhaul its space station program, is debating whether or not to move the oversight and management facilities now in Reston to other NASA centers.

The story quotes an aid to Virginia Senator Charles Robb saying this move would not be a good thing for Virginia because there are other contractors and subcontractors who have located near the NASA facility which would be affected.

The story says that NASA responded it would announce its decision on the move within the next month.

Space Station Utilization Team Weekly Meeting Minutes
For additions or changes to this list, contact Randy Cassingham

Distribution	Sec	Mail Stop	Phone	NASAmail	TELEmail
Aster, Bob	311	601-237	4-1369		
Badilla, Gloria	521	301-456	249-5252		
Beck, Hank	120	Reston ✓	8-457-7648	Hank.Beck	
Beatty, Richard	120	Reston ✓	8-457-7592	RBeatty	
Bergstrom, Sheryl	374	JPL-Cape ✓	8-253-2161		
Borden, Chet	311	601-237	4-1238		CBorden
Brown, David	331	Code MU	8-453-1179	DHBrown	
Cassingham, Randy	311	601-237	4-1273	RCassingham	
Chen, Bing	355	183-901	4-5353	CPChen	
Coffin, Dick	317	301-280 ✓	4-3730	RCoffin	
Cutts, Jim	800	180-604	4-4120		
Deshpande, Govind	311	601-237	4-1279	GDeshpande	
Devirian, Mike	120	Reston	8-457-7209	MDevirian	
Doane, Jim	311	601-237	4-7996	JDoane	
Easter, Bob	120	Reston	8-457-7211	REaster	
Elachi, Charles	700	180-704	4-5673	CElachi	CElachi
Fitzhugh, H.L.	374	179-206	4-6906	HFitzhugh	HFitzhugh
Frederick, Suzanne	311	171-258 ✓	4-1181	SKFrederick	
Friesema, Stuart	HQ	Code MU	8-453-1184		
Gabriel, Steve	521	301-460	4-4952		
Garrett, Hank	521	301-456	4-2644		
Glavich, Tom	385	169-314 ✓	4-3952	TGlavich	
Glazer, Stu	HQ	Code SN	8-???-????		
Goranson, George	521	122-113	4-2809		
Gray, Bill	312	301-170U ✓	4-1090	BillGray	
Grumm, Richard	355	233-200	4-9267	RGrumm	
Handley, Tom	366	301-440 ✓	4-7009	THandley	THandley
Hansen, Bert	347	198-219 ✓	4-6092	BHansen	BHansen
Hartsough, Chris	367	301-350 ✓	4-1498	CHartsough	
Hendrickson, James	354	157-410	4-3458		
Henry, Paul	311	601-237	4-1257	PHenry	PHenry
Hixon, Dave	120	Reston	8-457-7220	DHixon	
Hooke, Adrian	317	301-235 ✓	4-3063	AHooke	
Horttor, Richard	339	161-228 ✓	4-2462	RHorttor	
Houseman, John	385	125-112	4-1601		
Hyde, James	120	Reston	8-457-7204	JHyde	
Ivie, Chuck	311	601-237	4-9090	CIvie	
Kehoe, Tom	120	Reston	8-457-7206	TKehoe	
Kelley, Jim	861	180-602	4-7068		
Kern, Dennis	521	301-456	4-3158		
Kern, Roger	355	89-2	4-2233		
Kleine, Henry	363	510-264 ✓	7-9690	HKleine	
Kossmann, William	120	Reston	8-457-7207		
Krauthamer, Stanley	342	303-300	4-7740		
Kuberry, Dick	521	301-460	4-8827		
LaBaw, Clayton	382	11-116	4-6248	CLaBaw	
Laeser, Dick	120	Reston	8-457-7200	RLaeser	
Laskin, Bob	343	198-326	4-5086	RALaskin	
Lattu, Kristan	374	179-206 ✓	4-2499	KLattu	
Lemmerman, Loren	790	233-200	7-????		
Levin, Dick	311	601-237	4-1253		
Lewis, Donald W.	797	183-801	4-0840		
Lisman, Sima	343	198-326	4-4022	SLisman	
Luchik, Tom	354	125-214	4-3165		
Lyu, Michael	522	125-233	4-9411		
Mahoney, Bill	328	169-327	4-6606	WAMahoney	
Mahoney, M.J.	383	168-327	4-5584	MJMahoney	
Martin, Benn	780	264-648 ✓	4-8263	Benn	NSCAT
Masline, Richard	366	301-440 ✓	4-4889	RMasline	
Mattingly, Richard	313	233-302 ✓	4-4605	RMattingly	

	Sec	Mall Stop	Phone	NASAmail	TELEmail
Maud, Don	311	2158 LaJolla Dr.	Stockton, CA 95204	MHumfreville	
Merrill, Orin	120	Reston	8-457-7223		
Millard, Jerry	354	89-1	4-2898		
Muirhead, Brian	352	158-224	4-8179	BMuirhead	
Murphy, Gerald	521	301-460	4-4952		
Nishioka, Ken	381	168-227 ✓	4-7674		
Oleson, Gary	120	Reston	8-457-7590		
Pappano, Al	213	180-402	4-5007	APappano	APappano
Paul, Lori	311	601-237	4-1166	LPaul	
Petrasek, Irene	521	301-460	7-7777		
Pomphrey, Rick	366	100-22 ✓	584-2964	RPomphrey	
Pravdo, Steve	381	168-222 ✓	4-3131	SPravdo	
Rayman, Marc	312	301-170K ✓	4-2544	MRayman	
Reiz, Julie	640	512-110	7-7664		
Rosenberg, Leigh	311	601-237	4-1251	LRosenberg	
Schlue, John	521	301-466	4-7318		
Schober, Wayne	881	180-603	4-8581	WSchober	
Shao, Mike	385	169-214	4-7834		
Shishko, Bob	311	601-237	4-1282		
Simmons, Larry	790	233-208	4-6336		
Smith, Jeff H.	311	601-237	4-1236	JHSmith	JHSmith
Smith, Jeff L.	311	601-237	4-1064	JLSmith	
Staehle, Rob	311	601-237	4-1176	RStaehle	
Steele, Laura	311	601-237	4-1284	LCrary	
Starsman, Ray	120	Reston	8-457-7226	RStarsman	
Tai, Wallace	317	301-235	4-7561		
Taylor, William	HQ	Code M-8 ✓	8-453-2961	WWTaylor	
Thomas, Valerie	521	301-466 ✓	4-7472	VCThomas	
Tsou, Peter	???	183-501	4-8094		
Urban, Mike	120	Reston ✓	8-457-7591	MUrban	
Varsi, Giulio	880	180-603	4-2992	Varsi	
Volkmer, Kent	311	171-258 ✓	4-1240	Volkmer	
Von Gronefeld, Peter	120	Reston	8-457-7649	PVonGronefeld	
Vuolo, Bob	120	Reston	8-457-7587	RVuolo	
Wada, Ben	354	157-507	4-3600		
Webb, Allan	120	Reston ✓	8-457-7589	AWebb	
White, Robert H.	784	233-200	4-6786	RHWhite	
Wernitz, David	311	601-237	4-1270		
Wiener, Paul	310	301-230 ✓	4-5748		
Wright, Frank	740	180-335	4-5690	FWright	FWright
Zygielbaum, Art	750	180-701	4-3564	AZygielbaum	

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Total: 101 (73 paper, 28 NASAmail) * Printed 29 January 1991


JET PROPULSION LABORATORY

INTEROFFICE MEMORANDUM

311.4-650

11 February 1991

TO: Distribution

FROM: Randy Cassingham 

SUBJECT: Space Station Team Meeting Minutes for 11 February 1991

PRESENT: Rob Staehle, Randy Cassingham, Paul Henry, Bob Aster, Hershaf Fitzhugh, Gerry Murphy, Chuck Ivie

Next Meeting: 25 February 1991 at 10:30 In 301-169

Note: Next week's meeting is canceled due to travel, as was last week's meeting.

Rob Staehle

Rob received a copy of a memo by Phil Cressy/SM (Chief, Space Station Utilization Branch) on "Phased Requirements for Space Station Utilization". It reflects an apparently increased emphasis on using untended periods of time for microgravity payloads, noting that "three opportunities for science operations are foreseeable. In order of priority, they are: Utilization Flights, Untended Periods, and Assembly Flights. The Office of Space Science and Applications (OSSA) has evaluated the conditions and resources necessary to operate the pressurized laboratory research facilities in our latest Payload Traffic Model to utilize these opportunities." There are additional notes under each of the three opportunities:

- **Utilization Flights:** "These are flights to the station for the primary purpose of bringing up four station/payload scientists to conduct experiments in the on-orbit laboratory facilities. ... (A) n average up rate of about three payload racks per Utilization Flight is estimated, assuming three utilization flights per year as cited in Dr. Fisk's November 19, 1990 memo. In addition, logistics resupply will be required on each flight (an average of about one rack per every three racks of operated payloads) and middeck storage for samples up and products down is required. We assume the Shuttle is attached to the station for at least 13 days, although longer visits may be feasible. Allowing three days for station arrival and departure duties leaves ten days for utilizing the station. ... Data handling capabilities at the level currently available on Spacelab are acceptable (e.g., Ku band plus removable media), but formats and interfaces must not change in the transition from man-tended to manned operations."
- **Untended Operations:** "If the space station is to provide a substantive improvement in opportunity over that of Spacelab missions, the unmanned intervals between utilization or assembly visits to the station must be used. These periods provide excellent opportunities for many areas of research, especially because of the stable microgravity environment. Resource and environmental requirements are still modest. Average power requirements would typically be less than those during Utilization Flights. Routine monitoring of facility performance, and occasional command uploads, will be required, but the experiments will be chosen to take advantage of the prolonged uninterrupted period, and real time intervention will be limited. ... The amount of data downlinked depends on the availability of on-station data storage; we have assumed buffer storage is not a limiting factor for this analysis...."
- **Assembly Flights:** "If crew time becomes available on assembly flights (whose primary purpose is to assemble the station), utilization of experiment facilities on a non-interference basis should be feasible. ... Flight crew skills would be expected to emphasize station assembly responsibilities, payload scientists would not be expected to be available, and demands for crew experiment support would be adjusted appropriately."

The above descriptions, augmented by the attached data, should provide a clear and useful basis for determining whether proposed station accommodations during these periods meet OSSA requirements. *Let me emphasize again the importance to OSSA of the unmanned*

period between station visits. ...It is only the unmanned periods between visits that offer the potential for station, prior to permanent manning, to be a substantial improvement over the ongoing Spacelab program." (emphasis added)

A memo from Robert Moorehead/MS (Deputy Director, Space Station Freedom Program and Operations), notes his view of the restructuring "strategy": "The direction from the Associate Administrator following the January 15 briefing was to concentrate on developing a man-tended capability (MTC) by December 1996, that fit within the congressional envelope and maintained adequate reserve levels. The major elements of that MTC are one node module, one lab module, minimum truss, KU band downlink (50 MB) and the necessary systems to support the operation of the MTC station including two [note that OSSA is counting on *three*] utilization flights per year. The first element launch date is September 1995. ...It is my intent to energetically pursue reducing the cost of this MTC configuration to the minimum possible. This is to include incorporation, as appropriate, of the actions already assigned as well as new ideas you may recommend. If we are successful in this, we will develop a wedge within the funding envelope that will allow us to proceed to a permanently manned capability (PMC) as soon as possible."

Moorehead also sent out a memo on "Space Station Freedom Program (SSFP) Methods and Tools Survey". He is "a strong supporter of the concept of a uniform and comprehensive set of methods and tools that, when operated as a system, fully supports the 'end-to-end' process of developing, maintaining, and managing SSFP operational software. However, there is some concern that, for many phases of the software life cycle, SSFP mandated methods and tools are either not yet available or may not support current work package and user needs." He has asked the Charles Stark Draper Laboratory, Inc., "to support the SSFP in an inventory and evaluation of methods and tools currently being used by the program and those planned for the future. This task will include the identification of problem areas, recommended approaches and, where appropriate, proposed solutions." Bob Aster is to determine what, if anything, JPL/Pasadena will provide in response to this survey.

Rob has received a copy of a stop work notice for all tasks under UPN 450-00-00-00-00 as all funding authority has been fully obligated. For Space Station, this includes all 345-xxxx and 510-xxxx accounts; these accounts have been closed. Wayne Eklund indicated that another project is responsible for exhausting these funds. He will try to recover unspent funds for OSSA Science Utilization Management tasks.

Jim Hendrickson/354 has provided a review for Bob Glass/JSO of a change request to the PDRD, "Change to Factors of Safety Table 3-3".

Dan Duesler/Professional Development notes that he receives many requests regarding Learning Tree International classes. "While our experience indicates that the courses are very good, they are also very expensive, averaging about 20K for a hands-on course. Professional Development attempts to have a Learning Tree course every semester if we have enough interest in the course." Anyone interested in Learning Tree Int'l courses should make their interest known to their Division AAs. The AAs have a list of the available courses on Software & Systems Engineering, Programming Languages & Operating Systems, Communications Systems [including ISDN and fiber optics classes], Datacomm & Computer Networks, Local Area Networks, Expert Systems & Database Systems, and Digital Processing & Computer Systems.

Rob has a copy of Adrian Hooke/317's paper, "CCSDS Advanced Orbiting Systems: International Data Communications Standards for the Space Station Freedom". Rob notes that it is a very good overview of data communications standards for anyone interested in the topic. The paper was published in the September 1990 issue of *IEEE Network Magazine*.

The Grumman Space Station Program Support Division has announced the appointment of "a Verification Office, with Mr. Armand Della Monica detailed as Director, reporting to Ed Smylie, Vice-President of Technical Operations." The office's charter notes "the purpose of the SSEIC Verification Office is to provide, for the SSFP, the integrating contractor Level II management perspective and technical oversight for all verification activities including Level II requirements, plans, schedules, and

data bases: element-to-element and system-to-system test requirements, integration, assessment and control; end-to-end assembly and checkout for factory, launch site, and on-orbit; implementation of combined avionics/software and stage integration facilities for integrated testing; flight, ground, and orbital support equipment program; and on-orbit verification."

The JSO closeout schedule is now complete and under change control (by Dick Laeser and Bob Easter). Rob will be contacting everyone who will be affected by the closeout in the near future.

A new structure for Level II Working Groups and Technical Panels has been released. The summary charts showing the structure are attached.

Rob will be setting up a briefing in March to John-David Bartoe/MU (head of Level II Utilization and Operations) regarding ongoing and terminating JPL tasks with results relevant to his function. Dr. Bartoe wanted to be sure that Remer Prince/MUU would be in attendance; Remer is currently out having back surgery.

Paul Henry

Paul has received the go-ahead to start work on the development of utilization policies for the Level I utilization office (Code MUU). He is setting up a kick-off meeting next week with Codes M and B to discuss what form the policies should take (NMI, Program Directive, etc.).

Hershal Fitzhugh

The final draft of the "SSF Payload Integration Center Group White Paper" has been released by the Space Station Freedom User Utilization Project Office. Fitz, Rob Staehle, and the Space Station library all have copies.

Edmond Reeves/SM (Deputy Director, Flight Systems Division) has issued a memo regarding the Space Station Restructuring Meeting, which was held January 29, describing the results of the "hectic activity on restructuring the station". According to the memo, the current "schedule is based on First Element Launch (FEL) in September 1995, Man Tended Configuration (MTC) in December 1996, Permanently Manned Capability (PMC) in December 1999, and no projection significantly beyond PMC (with the internationals). The budget appears to be very close to the Congressional limits, and reserves have been identified. There are six flights between MB-1 in September 1995 and MTC in December 1996, two initial flights one month apart, and subsequent flights on three month centers. Although the Work Packages support this, there may be managerial/policy implications to slow down this initial planned rate [not to mention limited Shuttle capability]. A 'minimum MTC' approach was abandoned because the construction path did not lead logically to further development beyond a dead-ended 'minimum PMC'." An attached viewgraph shows the MTC and PMC configuration.

Communications Analysis Team (Bob Aster)

The CAT had several deliverables and accomplishments in the two weeks since the last meeting:

- a set of objects to be used in future FROST analyses were identified, and a partial set of data was delivered to JSO. The data were entered into a database program and delivered with a Users Guide.
- Chuck Ivie and Jerry Olivieri visited JSC January 29-30. They witnessed a demonstration of Mission Control operations, obtained available information on the restructured Space Station information system architecture, and established contacts that will supply information in the future.
- Bob Aster visited Reston January 31 to attend a Level I discussion on Space Station evolvability (see details below) and to discuss task status with Bob Vuolo/JSO.
- Chuck Ivie delivered a sample Data Flow Diagram and accompanying text to Bob Vuolo.
- Review comments for the Analysis of Flow Control paper were incorporated and a new draft delivered to Allan Webb/JSO.

- In the near future, CAT will:
- Provide an initial capacity/latency analysis, focusing on known differences between the restructured architecture and the ISPDR architecture. This analysis will be updated at the end of each month, and will be particularly updated for the Communication System Engineering meeting in March.
- Deliver Data Flow Diagrams for all architectures by February 15.
- Continue to add performance data to the Object Library in order to analyze new architectural options.
- Decline in staffing by nearly one workmonth per month, as per plan.

At the Reston evolution meeting, the Level I position was to provide for evolvability in as many ways as possible. They considered the following items to be of highest priority: ability to add power, ability to increase the permanent crew size beyond 4, ability to add pressurized volume, ability to expand existing structure, and accommodation of an advanced space suit. Bob called attention to the absence of "ability to increase capacity of the information system" on the high priority list to avoid expensive retrofits in the future. Bob says Earle Huckins (Level I Director of Space Station Engineering) "now knows us" and may be interested in our inputs on information system evolvability.

Gerry Murphy

Gerry attended an external environment workshop January 29-30 at MSFC. Both payloads and systems were covered although there are currently "no provisions" for external payloads and, for now, the prospect of external payloads on the JEM Exposed Facility are being ignored. Some early results from LDEF were also discussed. Gerry found the meeting to be very interesting, and, appropriately, highly technical.

Chuck Ivie

Chuck and Jerry Olivieri will be writing a more detailed trip report on their travel to JSC; Chuck found the trip very worthwhile, and so apparently did JSC. JSC personnel have indicated a willingness to cooperate with us, perhaps making use of FROST and FROST-like tools for evaluation of alternative architectures and establishing performance measures of these alternatives. This potential is being pursued both by people at JSC and JPL. They are willing to contribute architecture information to us if we can contribute the tools to them.

Chuck was asked to be part of the "Mode Team", a DMS user support group. He participated in a telecon for the group on Thursday.

Chuck returned with a video that he took with his camcorder. It shows the Spacelab training facility and mission support area, the Mission Control Center, the Space Station mockup, and the support areas outside Mission Control. Chuck is willing to lend the tape to anyone who wants to see it.

Upcoming Meetings

February 26-28: Electrical Power System Working Group meeting at LeRC. Stan Krauthamer to attend.

February 27-March 1: Space Station Science and Applications Advisory Subcommittee (SSSAAS) meeting at KSC. Hershal Fitzhugh to attend.

March 19-21: Mission Management Director's Review/Science Utilization Management Director's Review (MMDR/SUMDR) at KSC. Hershal Fitzhugh to attend.

March TBD: Communication System Engineering Meeting in Reston. Bob Aster and Chuck Ivie to attend.

March TBD: Intercenter System Engineering Team (ISET) meeting, to be held this time at JPL. Dick Grumm to attend.

April 26-28: External Environment (topic: ionizing radiation) meeting at MSFC. Gerry Murphy to attend.

August 6-8: Second Evolution Symposium: "Beyond the Baseline '91" at the South Shore Harbour in League City. Paul Henry and Jeff H. Smith to attend.

Recent Space Station-related items from Code P's "Daily News in Brief" (Typos *not* corrected...)

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Washington Times -- 1/31/91
"WOLF TUGS AT HEART STRINGS TO SAVE NASA'S RESTON OFFICE" By Chris Harvey

"Rep. Frank Wolf of Virginia has tried arguing with facts to make a case for keeping NASA's space station office in Reston. Now he's resorting to feelings."

The times reports that Wolf has sent a letter to a key NASA official wherein Wolf said the children of relocated NASA workers could become emotionally distressed by a move that would, for some, be the second such move in five years.

The story says that Wolf argued that worker productivity could fall off because of a weakened morale and that some of the workers could be crippled financially because they would be unable to sell their homes.

The Times reports that Wolf wrote the letter to Dr. William Lenoir, NASA's director of shuttle and space station programs. NASA has responded, according to the story, that a decision would be made in two to four weeks and wouldn't be made in a vacuum but would be made with an effective rationale.

According to the story, more than 70 Reston space station employees have contacted Wolf with concerns.

New York Times -- 2/7/91
"SPACE PROGRAM SHIFTS FOCUS" By Richard Stevenson

"New Government efforts to refocus the space program are rippling through the aerospace industry. While they are brightening the prospects for makers of unmanned rockets, the evolving changes are clouding the future for building space shuttles and forcing a scaling back of other programs like a space station."

The Times reports that after years of confusion about the nation's space policies, industry executives are increasingly heartened by what they see as a more coherent and realistic approach by both the Administration and the Congress.

The story says that much of this optimism is based on a recent report by the committee chaired by Norman Augustine and that in the report, the committee recommended very strongly support for unmanned projects as well as human exploration activities.

The article also says that there is some uncertainty which remains about the general future of NASA's programs and that these uncertainties come at exactly the same time that the fledgling space business is trying to firmly foot itself.

The Times, in this article, attempts to summarize the past ten years of fits and starts for such projects as the space station and new launch vehicles, and illustrates what it sees as a sharper focus to the overall program by citing comments from various industry leaders from Rockwell, McDonnell Douglas, and others who espouse optimism.

New York Times -- 2/7/91
"OFFER OF FREE VOYAGE IN SPACE SENDS 2 TO TEXAS JAIL" By Lisa Belkin

"Two founders of a company that is offering Americans a free ride on the Soviet space station were arrested today and charged with operating an illegal lottery."

The Times reports that the two, David Mayer, president of Space Travel Service Inc., and his senior vice president, James Davidson, were charged with promotion of gambling and are currently being held on \$2,000 bail at the Harris County, Texas, jail.

The story says that in December, Space Travel Services announced that American citizens could win the trip by calling a 900 telephone number, at a cost of \$2.99 a call. The story says Space Travel Services indicated that a semifinalist would be chosen each month and that a final winner would be announced in December, 1991.

The Times reports that the contest created a stir within two weeks after it was announced when the Soviet press agency Tass called the whole affair a hoax. The story says that officials of the Soviet space agency have since confirmed that the company was authorized to offer the trip.

The story says that Space Travel Services representatives told the Times that they were under the impression that the Harris County District Attorney's office was not going to press charges and that there must have been some kind of missed communication.

Christian Science Monitor -- 2/8/91

"LDEF SATELLITE BIG SUCCESS GLEANING SPACE EFFECTS DATA" By Robert Cowen

"Remember the Long Duration Exposure Facility (LDEF) satellite that the space shuttle Columbia rescued a little over a year ago? It's turning out to be a treasure chest of scientific and engineering data."

The Monitor says that scientists examining the data have already found an "awful lot of exciting results" and that many of the results are with materials which might be used for the future design of spacecraft.

The story says that some materials, particularly paints, degraded faster than the scientists had anticipated and as a result might not be used to coat future spacecraft parts. Other materials, the paper says, survived with no degradation where some was expected, like certain glass samples, and that, too, was a surprise to the analysis team.

The experiments have also shown some fundamental scientific findings as well, the paper reports. One such finding was the unusually high amount of beryllium-7. This, the paper reports, is a rare radioactive isotope, which was found in abundances ten to a hundred times higher than predicted.

Washington Times -- 2/8/91

"SOVIET SPACE STATION DEBRIS FALLS"

"A Soviet space station the size of a railroad car plunged through Earth's atmosphere early yesterday and flaming parts showered a trash dump in southern Argentina, witnesses said."

The story says that firefighters, followed by scores of residents, searched the city dump in Puerto Madryn following the crash looking for pieces of the Soviet Salyut-7 space station.

The article says that residents in the town, an Atlantic coast town 800 miles south of Buenos Aires, saw what they believed to be a large piece of space debris fall at about 1:45 am local time and that fires broke out immediately after the fireball was sighted.

The story quotes a fire station subchief from the town who said "we have not come up with any chunks yet. But I can tell you it was one hell of a fire, not the kind we are used to putting out."

The article concludes by noting that by late afternoon there had been no reports of injuries, nor of any fragments recovered.

Space Fax Daily -- 2/11/91

"SPACE TRAVEL SERVICES TURNS TO LEGAL FUND"

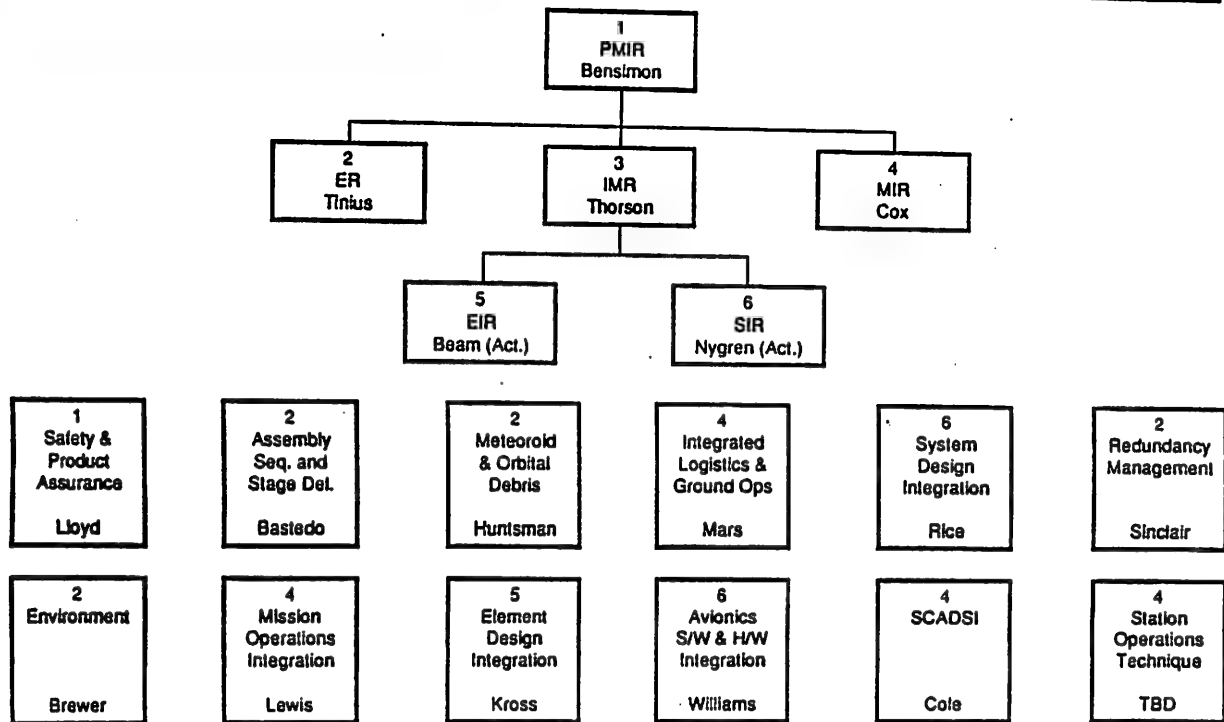
"Because their company checkbook has been confiscated by the Harris County District Attorney, David Mayer and Jim Davidson of Space Travel Services (STS) have been forced to lean a legal defense fund to combat a gambling charge for supposedly running an illegal lottery in the state of Texas."

The newsletter says last week that the Harris County District Attorney's office suddenly claimed that the contest to send an American citizen to the Mir space station was illegal and closed the operation down. The newsletter says the DA's office considered the \$2.99 call to the company's office phone to register for the drawing the same as having to purchase a lottery ticket.

Space Fax says that Mayer and Davidson told the newsletter they were not running a lottery and quotes them as saying "we have not received any funds from the telephone company." The story further quotes Mayer as saying "we terminated the 900 service number to show our good faith. We are happy to comply with any final judgement on the disposition of those funds."

The report says that the Houston Space Society and the Space Frontier Foundation have set up a legal fund to support the two space entrepreneurs.

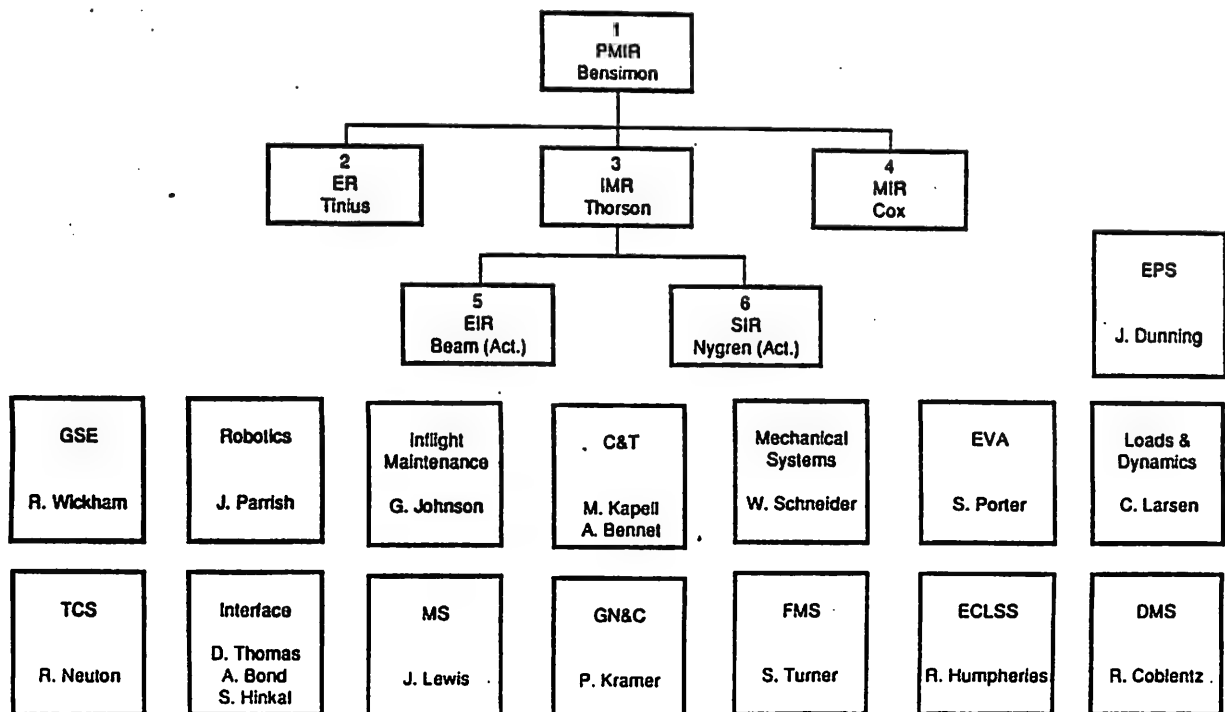
Program Summary Level II Technical Panel Structure



11/20/90

2-8

Program Summary Level II Working Group Structure

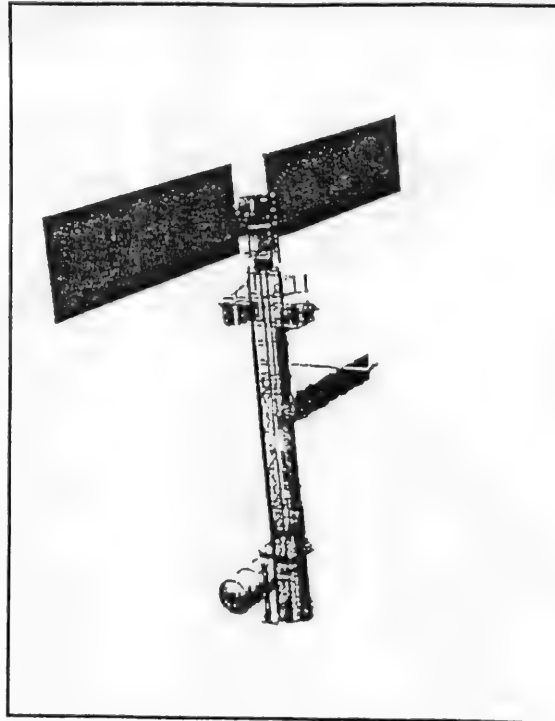


11/20/90

2-9

MAN-TENDED CONFIGURATION:

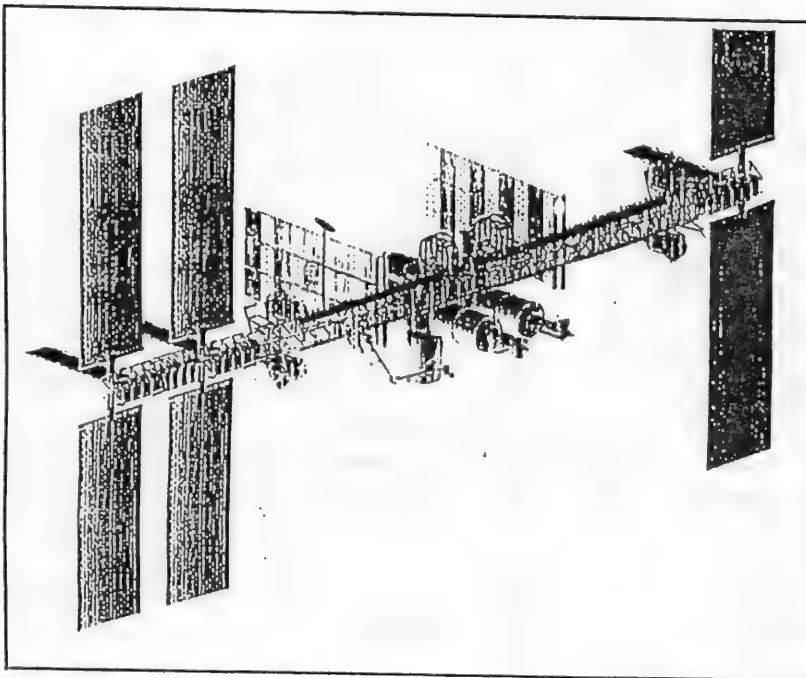
- Half transverse beam (pre-integrated)
- 1 PV Module (18.75kW)
- 1 microgravity lab (24 racks)
- 1 Node
- 2 Propulsion modules (downsized)
- Simplified MT



01/29/91 M/M MS 8100123 15/P

PMC CONFIGURATION:


- Full transverse beam (preintegrated)
- 3 PV Modules
- 1 microgravity lab (24 racks)
- 1 Hab Module (24 racks)
- 2 Nodes
- Airlock
- ACRV
- 4 Propulsion Modules (full soze)
- Crew accomodations for 4



01/29/91 M/M MS 8100123 17/P

25 February 1991

TO: Distribution

FROM: Randy Cassingham 

SUBJECT: Space Station Team Meeting Minutes for 25 February 1991

PRESENT: Rob Staehle, Randy Cassingham, Bob Aster, Henry Kleine, Richard Grumm, Hershaf Fitzhugh, Paul Henry

Next Meeting: 4 March 1991 at 10:30 in 301-169

Note: Last week's meeting was canceled due to travel.

Rob Staehle

According to a directive to the Director, Space Station Freedom from William Lenoir/M (Associate Administrator for Space Flight), "Formal approval of the Space Station Restructured Program plan is anticipated to require a month or so before National Space Council concurrence and Congressional approval is attained. To minimize additional schedule slips and to optimize spending, you should begin to implement the recommendations presented to me on January 30, 1991, as amended. Appropriate modifications to these directions will be issued after formal approval is received. The significant milestones are: First element launch – November 1995; SSRMS on Flight MB-3 – March 1996; Man-tended Capability, Flight MB-6 – December 1996; JEM Module – June 1998; ESA Module – September 1998; Third PV Array – December 1998; JEM ELM, EF – March 1999; Permanently Manned Capability – September 1999.

"The program is to be developed and operated in distinct phases. The initial phase is to develop a man-tended capability and, subsequently, to operate 2-3 utilization flights per year until permanent manning is undertaken. The second phase is to develop a permanently manned capability as early as appropriated funds will support. The follow-on phase will enhance and grow the station's capability and plan on the availability of a new unmanned launch system, but detailed concept development and planning should not be undertaken for several years. No development funds are to be spent on the follow-on phase at this time.

"A full-time manager responsible for development of man-tended capability should be appointed and should report directly to the Deputy Director. First element launch in November 1995 and attainment of man-tended capability in December 1996 are level zero milestones to be controlled by me.

Other significant items are: *Shorter Modules with Integration and Checkout on the Ground; *Truss Segments Assembled, Integrated and Checked-out on the Ground; *FTS Transferred to Code R – OAET; *Mobile Transporter Simplified; *Two nodes, vice Four; *50 Mbps, vice 300 Mbps; *Full-Size Logistics Module Deferred, 8-Double-Rack Module to be Supplied; *APAE Deferred – Contract Terminated; *Solar Dynamic Studies Stopped; *Astronaut Positioning System – Deleted; *Astronaut Work Platform – Deleted.

"Certain ground facilities are to be deleted or deferred. The Neutral Buoyancy Lab is deleted, and the Payload Operations Integration Center Coff is to be delayed until 1994. The Space Station Processing Facility at KSC will go forward, but outfitting must be phased for consistency with the new schedule. The Payload Operations Integration and Payload Training functions will utilize existing MSFC facilities until the POIC and PTC facilities are constructed and outfitted.

"Since the APAE was deferred indefinitely, the program should permit attached external payloads to draw support from external utility ports. Also, the program needs to develop a path that will allow a life-science centrifuge to be available in 1999.

"The Space Station POP 91-1 guidelines are to be issued the week of February 4, 1991, and are consistent with this direction.

"Since formal approval of the Restructured Program is expected in about a month, the directions above should be implemented with the caveat that some modifications are possible.

"The Program has just delivered another outstanding effort to develop a Restructured Program that is within the established ground rules. There is still a tremendous amount of effort ahead of us, and the continued excellent support from everyone involved is needed."

Larry Crawford has been detailed to head the Program Engineering Office; Dick Tinnius has been moved onto Moorehead's staff.

The Space Station Advisory Committee is meeting March 7-8 in an "open to the public" session. The Capital Gallery conference room holds 40 people.

John-David Bartoe/MU has agreed to hear presentations from Rob, Paul Henry and Bob Aster, but Bartoe wants to wait until Remer Prince has returned from back surgery. Remer is expected to return in the next week or so. Hershal Fitzhugh may also participate, and Rob has relevant material from Bob Shishko.

Bob White will be proposing a task to establish success criteria for Space Station payloads to Ed Reeves/SM. Jeff H. Smith/311 will be writing the RTOP; Rob and Ralph Miles will review 311's portion of the task. The task will establish guidelines for determining acceptable levels of risk for payloads, establishing just what level of risk is acceptable for different payload classes (A, B, C, or D).

Jeff H. Smith has drafted a task plan for Rob and Jim Kelley/861 to analyze laser beam power applications for Code RS. He plans to use some cost/performance tradeoff methods applied to earlier Space Station tasks.

The Soviet *Mir* space station's configuration was recently documented in a memorandum; a copy of the drawing is attached to the minutes.

Randy Cassingham

Randy has taken a position with SATCOM (Satellite Communications), editing their quarterly newsletter. This will take nearly full time. He will still be able to provide support for various Space Station tasks for the foreseeable future, but asks that anyone who requires such support give him as much notice as possible so he can schedule his time. Randy has edited and produced a large portion of the internal Space Station studies and other documents.

Communications Analysis Team (Bob Aster)

The data flow diagrams of alternative restructured architectures has been delivered to Reston. Bob commends Quintus Jett and Jerry Olivieri, both of Section 311, for their excellent -- and on deadline -- work on the data flow diagrams, which Bob says "are probably the most important deliverable from the Communications Analysis Team to JSO". Rob echoed this commendation.

An update to the FROST object library is on schedule for delivery this afternoon.

Bob expects to receive comments soon from Allan Webb/JSO on the most recent draft of the Data Flow study; it will be issued in final form shortly after the comments are received.

The CAT is working on an end-to-end latency analysis, which should be completed this week. A list of concerns -- and opportunities for improvements -- is being made. Early results on latency shows that there has been little improvement made since the last estimates....

As expected, CAT will be reducing staffing levels by .5 people next week. Further reductions are anticipated.

Henry Kleine

Henry has found a lot of interest from various potential sponsors for continuing the FROST work, but funding is scarce. JSO-provided funding runs out April 1. FROST is still successfully meeting JSO's requirements for the task.

Dick Grumm

Dick has set up a demonstration at JPL by Mack Alford, the chief scientist of Ascent Logic, who publishes the system design tracking product RDD (Requirements-Driven Development). RDD is already in use by Boeing on Space Station (for WP-01), and Boeing has a program in place to implement its use corporate-wide, starting with their new 777 jetliner. The demo will be held in the conference room next to von Kármán auditorium on March 7 from 2:30-5:00.

Hershal Fitzhugh

Fitz will be traveling tomorrow to attend the Space Station Science and Applications Advisory Subcommittee (SSSAAS) meeting at KSC. He expects to have a lot to report on at the next meeting. Rob asked him to ascertain the feelings of the science community regarding the Station; will they support it during the next budget battle? Such support may be critical.

Paul Henry

Paul was at headquarters last week to start up the user policy task. Most of the time was spent learning about the approval cycle for NMIs – NASA Management Instructions. That process was recently streamlined to about a three-month span – it used to take 8-12 months – since Adm. Truly was upset at how long it took for NMIs to get issued. The streamlined process for the NMIs originating from Code MUU is: 1) get all NASA organizations affected by the proposed NMI on board, getting their concurrence on the proposal; 2) submit a draft of the NMI to Kohrs; 3) submit the Kohrs-approved draft to Lenoir; 4) submit the Lenoir-approved draft to Keller; 5) submit the Keller-approved draft to the review board, which schedules it for review in 30 days, during which time the board receives comments; 6) the board meets, incorporates suggestions, issues action items; 7) two weeks later, another 30-day comment period begins; 8) the board meets and, assuming there are no further objections, the board votes on whether to approve or deny the request for the proposal to be issued as an NMI. As Barry Epstein/MUU wants to get going with the task, Paul plans to run a test case through the process to see if it runs smoothly.

Paul has received a copy of the "final draft" of the "Space Station Freedom User's Guide" (dated November 1990) for review. Upon cursory examination, it is apparently completely outdated (it reflects the pre-restructured Program); further, it seems the scope of the document is still poor, with not enough detailed information.

Upcoming Meetings

February 27-March 1: Space Station Science and Applications Advisory Subcommittee (SSSAAS) meeting at KSC. Hershal Fitzhugh to attend.

March 7: Demonstration/Presentation of RDD (Requirements-Driven Development) to Space Station personnel in the conference room next to von Kármán. Dick Grumm is coordinating.

March 19-21: Mission Management Director's Review/Science Utilization Management Director's Review (MMDR/SUMDR) at KSC. Hershal Fitzhugh and Bob White to attend; Jeff H. Smith and Rob Staehle may also attend.

March TBD: Communication System Engineering Meeting in Reston. Bob Aster and Chuck Ivie to attend.

March TBD: Intercenter System Engineering Team (ISET) meeting, to be held this time at JPL. Dick Grumm may attend.

April 26-28: External Environment (topic: ionizing radiation) meeting at MSFC. Gerry Murphy to attend.

August 6-8: Second Evolution Symposium: "Beyond the Baseline '91" at the South Shore Harbour in League City. Paul Henry and Jeff H. Smith to attend.

Recent Space Station-related items from Code P's "Daily News in Brief" (Typos *not* corrected...)

Washington Post -- 2/13/91

"BUSH ADOPTS ADVICE ON NASA BUDGET" By Kathy Sawyer

"President Bush's 1992 budget request for NASA follows the widely praised recommendations produced by a panel of experts in December, tilting away from the money-devouring space station project and toward a more balanced menu of science and technology development."

The story cites comments from House Science, Space and Technology Committee chairman Rep. George Brown (D-Calif.) who called the \$15.7 billion budget a good first step toward more stable funding and predictable growth for the space agency.

The Post reports that a key Senate aide indicated NASA and the Administration have come to grips with the agency's insatiable budget appetite with this new budget request. The story quotes the unnamed aide as saying "there are signs that NASA is internally confronting some of the sober realities."

Sawyer cites evidence from conversations with other staffers who indicate that NASA will face an uphill battle for the full budget request and that most of the competition within the funding authority of the House and Senate committees will probably come from the Veterans Administration, which, Sawyer relates, is in serious trouble and might have incoming wounded Desert Storm soldiers among its causes.

Space News -- Feb. 18-24

"HERMES, COLUMBUS SLOWDOWN DEBATED"

"The European Space Agency has proposed that its future space plane be delayed for at least two years, and that a major element of its space station contribution be postponed for a year or more and stripped of its compatibility with the U.S. space station, according to European officials."

Space News reports that these measures are designed to reduce the annual cost of these programs to ESA by ten percent in response to the German demands that ESA slash spending on its long-term program for the 1990s.

Space News says the ESA long-term program includes the Hermes shuttle-like space plane, the Columbus space station segment and the future Ariane-5 booster rocket. The paper says the combined budget for the three programs is more than \$15 billion.

According to the story, the Europeans proposed that Columbus be built for compatibility with Hermes only, dropping the docking capability with Freedom, which was to service Columbus on a periodic basis. The paper says ESA was approached with the new proposals in part because of perceived unreliability on behalf of the U.S. space station program.

Christian Science Monitor -- 2/26/91

"DISCOVERY'S GLITCHES ERODE CONFIDENCE IN SHUTTLE SYSTEM" By Robert Cowen

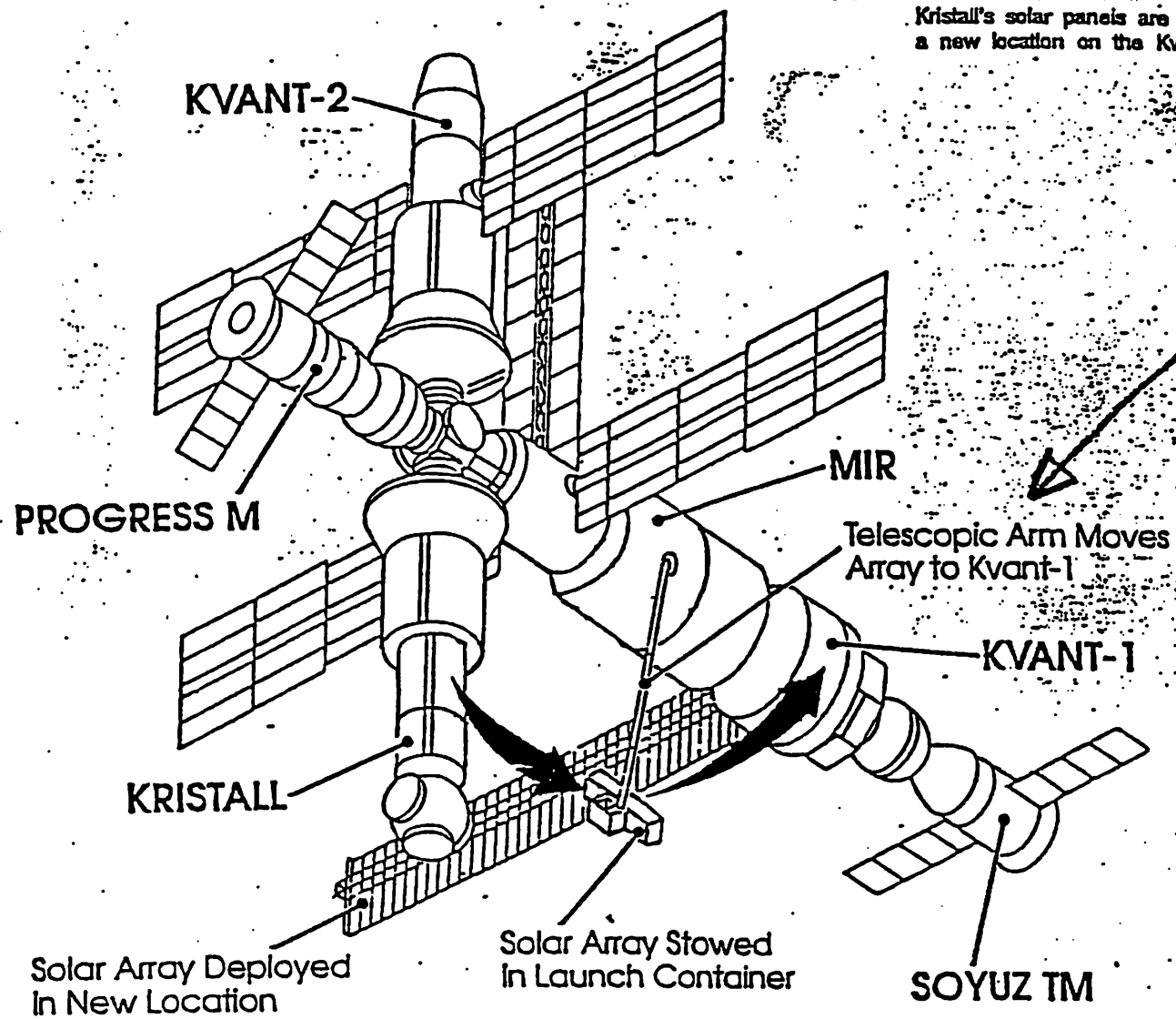
"Sitting on a launch pad at the Kennedy Space Center, Discovery is poised for the first of seven space shuttle missions planned for 1991. But once again, an unexpected technical problem threatens a tightly paced launch schedule."

The Monitor says that three of last year's originally scheduled ten missions were delayed and bumped into this year because of problems with the shuttle system which surfaced last summer.

The report says that NASA engineers are now engaged in tracking down the causes and assessing the impact of cracks found in two of the three orbiter's flapper doors which seal the underside of the vehicle after the external tank has fallen away.

The story recounts the saga of the fuel line door closing mechanism hinges and says that it was just this lack of robustness which caused the committee chaired by Norman Augustine to note that NASA was unwise to continue to rely upon the shuttle.

The Monitor does note that some of the problems are the result of the fact that safety now has major priority over scheduling matters. However, the paper remarks that the lack of robustness and the concern for safety place question marks on all the mission planning efforts.




Kristall's solar panels are to be moved to a new location on the Kvant-1 module.

311.4-660

4 March 1991

TO: Distribution

FROM: Randy Cassingham 

SUBJECT: Space Station Team Meeting Minutes for 4 March 1991

PRESENT: Rob Staehle, Randy Cassingham, Bob Aster, Hershal Fitzhugh, Chuck Ivie

Next Meeting: 11 March 1991 at 10:30 in 601-243

Note the new location for the meeting next week. The meeting might vary locations weekly, sometimes on Lab and sometimes at Woodbury.

Rob Staehle

Rob has a copy of the Space Station Control Board's "Space Station Restructuring Directive", signed by Moorehead on December 25. The directive was issued "to document the Program restructuring decisions and to issue the following action to the Project Managers and Level II Directors to use the Program restructuring decisions as a basis for updating the Program requirements baseline." According to the revised Program milestones, FEL is slated for November 1995; PMC by September, 1999.

Robert Moorehead (Deputy Director, Space Station *Freedom* Program and Operations) has issued a memo ordering that "(a)ll SSCBs [Space Station Control Boards] are suspended until further notice. All CRs that are currently in the Level II Configuration Management System and have not been dispositioned are canceled and must be resubmitted if the sponsor considers them valid. A moratorium is placed on new and resubmitted CRs against the Program Definition and Requirements Document Sections 3, 4, and 6; Architecture Control Documents (ACD); the Baseline Configuration Document (BCD) and applicable documents thereto pending completion of the Level II Baseline restructure scheduled for May 15. Special topic SSCBs may be conducted during this period on the call of the Chairman and the Executive Secretary. In order to meet this Level II Baseline date, several SSCBs will be scheduled to disposition updates to Sections 3, 4, 6; the ACDs; the parts of the BCD and other portions of the Level II Baseline as required."

A note in a recently received (but dated "October 1989") *Columbus Logbook*, an ESA publication, mentions the sheer amount of paperwork involved in the Space Station Program: "Considering that 21 tons of paper are being examined by a team of experts at ESTEC as we head towards phase C/D, you can well imagine that any industrialist or scientist willing to prepare an experiment can easily be put off by long searches into the basic documentation." The article went on to describe the Columbus Utilisation Information System (CUIS), an operating prototype by which prospective users can call up Columbus information and documentation using a PC and modem. No such system is approved for prospective users of U.S. hardware. Those interested in the topic should refer to Randy Cassingham's paper, *Space Station User Documentation: Lessons from the Space Shuttle*, JPL D-4487, dated June 30, 1987. Rob intends to bring up this topic -- and paper -- again with Remer Prince/MUU and John-David Bartoe/MU.

JSC has established a project office "for the development and implementation of Space Station *Freedom* flight operations. The Space Station Mission Operation Project Office resides within the Mission Operations Directorate, which has overall responsibility for the development and conduct of flight planning, training and operations for the Space Shuttle and SSF programs. ...The new office will be headed by Charles R. Lewis, who will report directly to Robert W. Moorehead (in Reston)... on all aspects of planning, training and management of SSF flight operations."

A memo from GSFC director John Klineberg to Associate Administrator for Space Flight William Lenoir noted that "(w)ith the termination of the General Electric contract for the Attached Payload and Accommodation Equipment (APAE) Project and the deletion of funding for the Space Station Flight Telerobotic Servicer (SSFTS) Program beyond FY91, the Goddard Space Flight Center plans no further support to the Space Station Freedom Program from Work Package-3." The memo notes James V. Moore as the single point of contact for closeout activities.

McDonnell Douglas has issued a report, *Lunar Transfer Vehicle On-Orbit Processing*, prepared for Code MT. It references work done in this area by Jeff H. Smith and Cate Heneghan of Section 311.

Rob received an interesting viewgraph showing the Space Station's milestones and upper management -- from 1982 to 1991. It is attached to the minutes, for reference.

Paul Henry is on travel this week. He has taken a position in Section 382, and will be making a transition from his Space Station work to his new work over the next couple of months. Rob and Paul are looking for someone to take over Paul's task for Code MUU to develop Space Station utilization policies.

Dick Grumm has found a position with Section 352, working on Cassini hardware. His Space Station work on the Modular Containerless Processing Facility was recently canceled. Dick has indicated he will be available for consultation.

Many thanks to Paul and Dick for their consistently outstanding performance.

Communications Analysis Team (Bob Aster)

CAT has delivered two items to Bob Vuolo/JSO: a latency analysis (the lower bound being about .5 seconds for one-way flows, about 1 second for transmission and answer), and an update of the FROST object library (with Users Guide) in both hard copy and electronic formats. No deliverables are scheduled for this week.

Hershal Fitzhugh

Fitz attended the Space Station Science and Applications Advisory Subcommittee (SSSAAS) meeting at KSC last week. The meeting broke into three parts (materials science, microgravity, and attached payloads); Fitz attended the microgravity sessions. The science community seems pretty well behind the Station's restructured baseline, except for scientists who wanted to use the recently deleted Attached Payload Accommodations Equipment (there is no money in the FY92 budget for attached payloads). Microgravity levels seem reasonable, and well mapped. They were pleased with opportunities to perform microgravity science during the times while no crew is aboard. The DMS looks more viable than before, but some interface problems remain. For instance, the science community is concerned that the payload processor's "microbus" is not a universal enough standard. They are also concerned whether there will be enough bandwidth left over for downlinked data -- especially video -- after the Station takes up its housekeeping data requirements. (Chuck Ivie noted here that at the recent Mode Team meeting, compressed video -- such as that used for the NASA videoconferencing system -- would be satisfactory for about 90% of science uses, but there is currently no space-qualified compression equipment available. Compressed video takes about 1.5 Mbps of bandwidth.) The Space Shuttle's video system is currently undergoing an upgrade, getting rid of the 1950-60's technology; the Space Station, which is slated to follow the Shuttle on communications items, will benefit from the upgrade too.

There was some discussion of vibroacoustics, and Fitz will provide Rob with a write-up on the topic produced at the meeting.

The science community likes the FDDI (fiber optic) bus more than the 802.4 bus. It has been proposed to link the modules with two fiber optic cables, but this may not provide enough bandwidth for the high data rates required between racks, especially for microgravity payloads, and for Station-to-

ground communications. There were also calls for an automated patch panel, so that communications could be rerouted even when the Station was not manned.

Mary Kicza/SN supports the transition of Spacelab experiment hardware to the Station, although the Centers have yet to indicate how much useful science would result.

There is still a debate as to whether the Station's internal pressurization should be 10.2 or 14.7 psi. The science community prefers 14.7 ("sea level" pressure), but the astronaut office prefers 10.2 to facilitate EVAs.

As an aside, Dr. Hoffman, who flew on the recent Astro Shuttle/Spacelab mission, passed high compliments to the JPL-built Astro Star Tracker, which essentially saved the science value of the mission when the primary tracking system to direct onboard telescopes failed.

The Small, Rapid Response (SRR) payload group is still very active, and has an office at JSC run by Earl Tiedt. The SSSAAS is very much in favor of a strong role for SRR payloads, despite opposition from the Space Station Advisory Committee, of which SSSAAS is a subcommittee. Many would like to see an SRR payload go on the Station with the first launch.

Fitz indicated that Bob Rhome/S and others showed top-level analyses of electrical power availability vs. demand. The match appears much closer now than in the past because installation of solar panels and launch of power-consuming user equipment is better coordinated.

Fitz said he heard the "Restructured Program" will be presented to Vice President Dan Quayle (as chairman of the National Space Council) prior to going to Congress. Congress mandated the report "in 90 days" last fall, and accepted an Augustine Commission recommendation to extend the deadline. A review with Administrator Truly is expected this week. It is rumored that Adm. Truly will attach a recommendation of the disposition of the Reston Operation at that time.

Upcoming Meetings

March 7: Demonstration/Presentation of RDD (Requirements-Driven Development) to Space Station personnel in the conference room next to von Kármán. Dick Grumm is coordinating.

March 19-21: Mission Management Director's Review/Science Utilization Management Director's Review (MMDR/SUMDR) at KSC. Hershaf Fitzhugh and Bob White to attend; Jeff H. Smith and Rob Staehle may also attend.

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August 6-8: Second Evolution Symposium: "Beyond the Baseline '91" at the South Shore Harbour in League City. Paul Henry and Jeff H. Smith to attend.

Recent Space Station-related Items from Code P's "Daily News in Brief" (Typos not corrected...)

New York Times -- 3/5/91

"NASA REDUCES COST AND ROLE OF ITS ORBITING SPACE STATION" By William Broad

"A simpler, more modest plan for NASA's space station is taking shape after budget cuts and the discovery of design flaws sent architects back to the drawing board."

The Times reports that the orbiting outpost, first proposed by President Ronald Reagan seven years ago, is still largely a castle in the clouds even though nearly \$3.9 billion has already been spent on various studies and prototype devices.

The paper reports that it obtained internal NASA documents that indicate the agency now plans to reduce the station's size and cost, cut its astronaut crew in half and make construction and repair activities easier. The paper says the plan has been submitted to the National Space Council which, it also reports, is unlikely to make any changes to the new plan.

The Times reports that, according to the internal documents, NASA has abandoned plans to make the station all things to all users. The paper reports that astrophysics and earth science pursuits are being given up to focus efforts and resources on microgravity and biological research activities.

The article quotes space policy expert Dr. John Logsdon, George Washington University, as saying "I think it's going to fly. NASA has finally gotten and responded to the idea of downsizing our ambitions to match our resources."

The paper cites remarks it says were made by agency chief Richard Truly to House Science Committee members last month that indicate NASA now believes the station design is in good shape and meets all its critics' comments. The Times quotes Truly as saying "it will be smaller. It will require fewer shuttle flights. It will be easier to build. It will be less expensive."

NASA - SPACE STATION FREEDOM MILESTONES/MANAGEMENT

Calendar Year	82	83	84	85	86	87	88	89	90	91
Milestones	<div>▽ Space Station Task Force established</div> <div>▽ Mission Analysis Studies</div> <div>▽ Concept Development Group</div> <div>▽ President directs NASA to develop permanently manned space station</div> <div>▽ Office of Space Station established</div> <div>▽ System Requirements Review</div> <div>▽ Phase B Memoranda of Understanding signed by NASA and international partners</div> <div>▽ Baseline configuration adopted</div> <div>▽ Critical Evaluation Task Force review</div> <div>▽ NASA Cost Commitment Review</div> <div>▽ National Research Council review</div> <div>▽ Phased approach adopted</div> <div>▽ Development contract start date</div> <div>Phase C/D/E Agreements signed by U.S. and international partners ▽</div> <div>Preliminary Requirements Review ▽</div> <div>Configuration/budget review ▽</div> <div>Preliminary Design Review ▽</div> <div>Integrated System Preliminary Design review ▽</div> <div>Restructuring assessment activity ▽</div>									
Administrator	Beggs				Fletcher				Truly	
Deputy Administrator	Mark				Graham	Myers			Thompson	
Associate Administrator, Office of Space Flight	Abrahamson		Moore			Truly			Lenoir	
Associate Administrator, Office of Space Station*				Culbertson	Hodge (Acting)	Stofan		Odom		
Space Station Program Director				Hutchinson		Aaron (Acting)	Moser		Tanner	Kohrs
Deputy Director, Space Station Program & Operations				Aaron			Sisson		Tanner	Moorehead

* Office of Space Station was combined with Office of Space Flight in December 1989. Program Director heads Level I and Deputy Director heads Level II.


JET PROPULSION LABORATORY

INTEROFFICE MEMORANDUM

311.4-668

1 April 1991

TO: Distribution

FROM: Lori L. Paul 

SUBJECT: Space Station Team Meeting Minutes for 4 March 1991

PRESENT: Rob Staehle, Bob Aster, Randy Cassingham, Paul Henry, Lori L. Paul

Next Meeting: 15 April 1991 at 10:30 in 601-243

Note: The last several meetings have been canceled due to travel.

Rob Staehle

A letter from Akiko Santo, Japanese Minister of State for Science and Technology, to Admiral Richard H. Truly expressed appreciation for the consideration given to International Partners during the recent restructuring of the Space Station. "NASA's approach this time was excellent in terms of consultation with the international partners...the technical impact on JEM development remained [minimal]. I am now confident that the outcome of restructuring is acceptable to STA [the Japanese Science and Technology Agency]."

Rob read the following excerpts from Dick Laeser's Space Station Freedom/JSO Weekly Activity Report of 26 March:

"Two versions of a video commonality directive are now in the system awaiting action. The first...directs the adoption of the camera developed by Work Package 1 (WP-1) for internal and external use...The second, as directed by the Deputy Program Manager, is silent on the subject of which camera to use and directs the establishment of a single video subsystem architecture at WP-1."

"A working draft of the Program Definition and Requirements Document Section 7 rewrite has been prepared...Considerable work remains, however, to complete specification of performance elements."

Chuck Ivie has been following the video commonality issue.

The *Columbus Logbook*, published by the European Space Agency, in its January 1991 issue covers "Research Opportunities in Space, Columbus Precursor Flights." The newsletter outlines Spacelab E-1 and E-2 and Eureka 2 and Eureka 3 project efforts and illustrates hardware under construction. Flights for those projects are scheduled for 1994 and 1996-7. Contact L. Paul at x4-1166 to request a copy of the publication.

Rob announced that JPL will be holding an Open House on 3 and 4 August 1991. 50,000 visitors are expected to attend. Plans are desired for a Space Station Freedom exhibit. Anyone interested in coordinating or participating should contact Rob.

Dick Grumm sent a description of the Space Flight Optical Disk Recorder. This Code R development was originally designed to record Space Station data at 300 Mbps for up to 45 minutes, but is now in search of a user. Contact Dick for further information.

Headquarters issued a press release summarizing the restructured baseline; a copy is attached to the minutes.

A current list of Work Package 2 representatives and alternates (including review boards, panels, sub-panels, and working groups) is attached to the minutes. Several of these people may become useful contacts for various JPL tasks.

Paul Henry

Paul will be attending the upcoming Evolution Working Group (EWG) meeting on 4 and 5 April 1991 in Reston to discuss the effects of station restructuring on evolution requirements. However, after this meeting, Paul will limit his future participation in the EWG to being JPL's alternate representative.

Anyone interested in replacing Paul as JPL's EWG representative should contact Rob. Many thanks to Paul for a thoroughly excellent job as our representative.

Interest in the Level II long-term plan may be rekindling. Paul is looking into the renewal of this task. (Paul delivered a draft long-term plan to Remer Prince and Barry Epstein last year.)

An NTR review praised Paul's Relocatable Utility and Communications Stand-Alone Kit (RUCSAK) and recommended that the concept be published in *NASA Tech Briefs*. Paul will follow up.

Randy Cassingham

The on-again, off-again *Introduction to Utilizing Space Station Freedom* document task is... on again. Thanks to the new, recently released restructured baseline. Remer Prince/MUU has asked us to rewrite the document to reflect the new Station, and to get it published and distributed as soon as possible. Randy and Laura Steele are heading the effort, and expect to deliver copies of the document by the end of the fiscal year.

In pursuit of the above goal, Randy has copies of the following documents, should anyone wish copies: the "Space Station Restructuring Directive of the Level II Space Station Control Board" and the viewgraph package "Report to Congress on the Restructured Space Station Program".

Bob Aster

The Communications Analysis Team (CAT) has three deliverables pending:

1. A data flow diagram report will be delivered on 1 April 1991.
2. A final version of the object library will be delivered on 1 April 1991.
3. A draft of "Analysis of End-to-End Information System Latency for Space Station Freedom — Case Study 4" was faxed last Friday (30 March 1991); however, the fax arrived in an unreadable condition, so a follow-up hard copy will be sent today.

Lori Paul

The restructuring of the Space Station has made several categories of documents in the JPL Space Station Library obsolete. In the next few weeks documents will be reevaluated and the contents of the Library revised. If you wish any specific pre-1990 documents saved, please contact Lori at x4-1166 as soon as possible.

Upcoming Meetings

April 4-5: Evolution Working Group, Reston, VA. Paul Henry to attend.
April 26-28: External Environment (topic: ionizing radiation) meeting at MSFC. Gerry Murphy to attend.
August 6-8: Second Evolution Symposium: "Beyond the Baseline '91" at the South Shore Harbour in League City. Paul Henry and Jeff H. Smith to attend.

Recent Space Station-related Items from Code P's "Daily News in Brief" (Typos not corrected...)

USA Today -- 3/6/91

"NASA CUTS MAY DELAY MOON, MARS POSTS" By Linda Kanamine

"NASA has scaled down its ambitious space station plan but the changes could delay permanent scientific outposts on the moon and Mars."

The paper reports that, under a new plan just presented to Congress yesterday, the orbiting manned laboratory will shrink to about half the size of a previous design with a cut in crew size from eight to four.

The story quotes NASA chief Richard Truly as saying "I am convinced the final proposal will be affordable, simplify the assembly and operation, reduce the size and complexity and maintain overall safety."

The Washington Times 3/14/91

GRUMMAN CUTS 110 MORE AT RESTON by Jay Mallin

"Grumman Corp. said yesterday it is cutting 110 employees at its Space Station Program Support Division in Reston and that 60 more jobs will be lost at its space station subcontractors."

For the 110 "basically it's layoff right now," and Grumman spokeswoman Elaine Hindale added "We don't know if some of them will be absorbed through transfers" to other parts of the corporation, according to the Times.

The Times reported the cuts follow 121 Grumman and subcontractor cuts in January. 655 Grumman/subcontractor employees are located at Reston according to the story.

The Times story continues, outlining the Space Station trimming at Congress' behest, quoting Grumman Division President Fred Haise's letter to employees explaining the necessity of the cuts, and noting that a Texas congressional delegation, in January, asked NASA to move the program from Reston to Johnson Space Center, Houston, and that Maryland Senator Paul Sarbanes suggested it be transferred to Goddard Space Flight Center, Greenbelt, Md.

The Washington Post 3/14/91

"IN BID TO KEEP NASA FACILITY, FAIRFAX WARNS MOVE WOULD BE COSTLY" By Kent Jenkins, Jr.

"Fairfax County officials, fighting to keep a high tech NASA facility that employs 1,000 people, charged yesterday that moving the installation would disrupt NASA's already troubled space station program and cost more than \$80 million."

Fairfax County Board Chairman Audrey Moore said that if the organization is moved from Reston, half its workers would quit, delaying the project for months or years, reports the Post. County officials say replacing and relocating these workers would cost NASA \$83 million to \$132 million, the article states..

A NASA spokesman said the agency had not reviewed the Fairfax figures and spokesman Mark Hess is quoted by the Post, saying that the issue "is broad enough that nobody could prove you right or wrong."

The Post piece continues, tracing space station history, political pressures, and personnel issues, such as cost of living. It also noted Virginia lobbying efforts resulting in a promise by NASA Administrator Truly that NASA would not abandon the Reston site, though not saying how many would remain there or what the facility's exact role would be, according to the Post.

The Washington Post 3/15/91

SKELETON SPACE STATION DECLARED UNFIT by Kathy Sawyer

"A National Research Council panel has concluded that a smaller, simpler new design for NASA's space station 'does not meet the basic research requirements' for which it is to be built."

The Post story terms the report a "shock" and a "serious threat" to the station's survival and that the redesign was widely viewed as "NASA's last chance" to save the centerpiece of its future.

The Research Council's Space Studies Board "scathing report" said "neither the quantity nor the quality of research that can be conducted" (on the space station) merits its costs, the Post reports.

The Board said that other grounds than scientific research could justify the station; such as international prestige and stimulating progress in education and technology, according to the Post piece.

Board chairman Louis J. Lanzerotti, AT&T Bell Labs, declared, "The monthly cost of constructing the redesigned station would approach the annual total funding devoted to both NASA's life science and microgravity science" for this fiscal year, wrote Sawyer.

The Post story continues outlining maximum station costs, the congressional funding environment, and the political and international scenario. An "administration official" termed as "familiar" with White House thinking reportedly said that the Space Council had been made aware of the report and that its conclusions "are potentially of concern to all of us."

NASA science chief Lennard Fisk, commenting on the report said, "The Space Studies Board has long been opposed to justifying Space Station Freedom solely on scientific merit" and that the station's capabilities would evolve over time to meet principle research requirements, according to the story.

United Press International 3/15/91 -- Cape Canaveral
By William Harwood

"In an unprecedented exchange, a Soviet cosmonaut may fly aboard a U.S. shuttle and a NASA astronaut may spend up to six months on the Russian Mir space station, if a superpower summit agreement can be reached, sources said."

Though no summit has yet been formally scheduled and details are lacking, US and Soviet officials hope to reach an agreement and NASA officials confirm some sort of mutual activity may be in the works, according to story sources.

NASA's spaceflight head, William Lenoir is quoted, "...we've laid out some options that could be accommodated if that's what we ought to do. Now we'll just stand back and wait and see what happens."

Washington space policy expert John Logsdon said "I think at the technical level the agreement is a done deal, that NASA and the counterpart organizations in the Soviet Union recognize the value of bringing U.S. instrumentation and U.S. research approaches to some joint life science work," according to UPI.

The story continued, citing a CBS News report Wednesday stating exchange flights would be scheduled within 18 months of signing an agreement, and noting beneficial life science studies that could result.

Washington Post -- 3/21/91
"REDESIGNED SPACE STATION WINS CRUCIAL SUPPORT" By Kathy Sawyer

"Vice President Quayle and the National Space Council yesterday approved NASA's revised design for the Space Station Freedom on grounds that, despite the severe shortcomings reported by scientific groups, the facility is vital to American leadership in space exploration."

The Post reports that the next move is up to Congress, which required NASA to redesign the space station last fall and which now must vote on its funding.

The story quotes Quayle as saying "the President and I are behind the redesign effort. This is a priority of the administration."

The Post also quotes from Federation of American Scientists space analyst John Pike as saying this station is "the house that the appropriations committees built. It's hard to see how they could take a significant amount of funding out of the station without destroying the social compact. The quid pro quo is, NASA will allow them to micromanage any program they can fund."

The Post then cites an unnamed but well placed congressional source who said "the sense is this one's going to fly."

The story also cites language in a letter from the Vice President to NASA chief Richard Truly wherein Quayle is quoted as saying "the most compelling reason for building a space station is that it is a necessary step to further American leadership in exploring space."

New York Times -- 3/26/91
"CUT-DOWN STATION MAY FALL SHORT ON SPACE BIOLOGY" By William Broad

"A little-known story of the space age, untold by laconic astronauts schooled to set aside emotion and play down danger, is just how bad weightlessness can be."

The lead article in the Times' Tuesday Science Section says that while logging more than 50,000 hours in space over three decades, American astronauts have suffered nausea, anemia, lethargy, loss of appetite, headaches, disorientation, motion sickness, heart palpitations, fatigue, depression, weakened defenses against infectious disease and a loss of blood volume, muscle mass and bone.

The paper says that such problems are expected to worsen as astronauts venture farther away from Earth for longer periods of time and that studying and combating such biological breakdowns is a key rationale for NASA's planned space station.

The Times says nevertheless, prominent scientists say that NASA has skimmed on such crucial items as research equipment to study the debilitating effects of weightlessness and that the station is more of a political showcase than a science facility.

The article says that Dr. William Lenoir, space flight chief at NASA, has rejected this criticism as being misguided and parochial and that the science group has never been a large supporter of the orbiting station. However, the Times says that respected experts agree

with the criticism and cites such things as the discontinuation of requirements for a centrifuge as examples of the station not meeting science priorities.

The paper says that both NASA and the White House say the space station is not being proposed just for the pursuit of science, that instead it represents a commitment of the U.S. to aerospace leadership and as a symbol of national pride.

USA Today -- 3/27/91
"SPACE STATION"

"NASA broke ground at Cape Canaveral for a \$56.2 million facility to prepare pieces of the space station Freedom."

The paper says the facility will be the space agency's largest construction project since the Apollo moon missions of the 1960's and that the new building is set to open in May 1995.

Washington Times -- 3/27/91
"SOVIET SPACEMEN CHECK DOCKING PROBLEM"

"Two cosmonauts running low on food and water left the space station Mir yesterday to investigate equipment problems that have kept them from getting overdue provisions."

The Times reports that Viktor Afanasyev and Musa Manarov, the two cosmonauts, are not in immediate danger but will have to dip into emergency food and water rations next week unless an unmanned resupply ship carrying supplies can dock with Mir. The story says the cargo ship has failed twice to dock with the astrophysics module docking port on the Soviet space station.

The paper says that during their space walk, the two cosmonauts determined that an antenna on the astrophysics module used for docking was not functioning properly. The story says that the cosmonauts managed to redock their ferry capsule from its previous location to the docking site on the astrophysics module, thus freeing another port for another attempt by the resupply ship, which will occur tomorrow.

Baltimore Sun -- 3/29/91
"SOVIET SPACE STATION NEARLY WRECKED"

"The Soviet space station Mir came within 40 feet of a collision with a cargo module that would almost certainly have killed the two cosmonauts on board, Soviet television reported yesterday."

The Sun story, filed from Reuters' Moscow bureau, says that ground control staff noticed only seconds before impact that computers which should have been helping an unmanned Progress-7 supply ship dock with the Mir were in fact steering it on a collision course.

The story says that the cargo ship was only 65 feet from impact when an alert controller overrode the supply ship's onboard computer causing it to avert a collision.

The article says that the two cosmonauts, Victor Afanasyev and Musa Manarov, were able to successfully repair the docking port and that the supply ship was not properly docked with the space station.

Mark Hess
Headquarters, Washington, D.C.
(Phone: 202/453-4164)

March 21, 1991

RELEASE: 91-45

SPACE STATION FREEDOM RESTRUCTURING PLAN COMPLETED

NASA today delivered the "restructuring" report to the Congress, outlining an extensive redesign of the Freedom space station. The new design is cheaper, smaller, easier to assemble in orbit and will require fewer Shuttle flights to build.

Major new features of the redesigned space station -- shorter U.S. laboratory and habitat modules that can be outfitted and verified on the ground and a pre-integrated truss that can be assembled on the ground and tested with all of its subsystems intact -- will significantly reduce intravehicular activity (IVA) and on-orbit extravehicular activity (EVA) needed to build and maintain Freedom.

"This new design for Space Station Freedom accomplishes every major goal we set for ourselves when we kicked off this effort last November," said William B. Lenoir, Associate Administrator for Space Flight. "We took the directions from Congress and the Augustine Commission recommendations to heart, and the program we are announcing today addresses each and every one of their requirements.

"We've cut costs, simplified the design and reduced the complexity of the project. At the same time, Freedom will be a quality facility, providing a research laboratory unsurpassed in the world for life sciences and microgravity research, and a stepping stone into the future, enabling NASA to conduct the research and planning necessary for human exploration of the solar system. And, we have maintained our international commitments," he continued.

A 1991 fiscal year budget shortfall of more than \$550 million, along with Congressional directions to significantly reduce out-year spending, prompted NASA to begin the restructuring of Freedom. Congress told NASA to expect no more than 8 to 10 percent growth over the next five years (FY 1992-1996), with peak spending for Freedom not to exceed \$2.5-2.6 billion. The budgetary ground rules, including the cut for FY 1991, represent a \$5.7 billion shortfall from what NASA had planned to spend for Freedom over that same time period.

NASA directed the review in November 1990 with instructions to the Freedom project team to: develop a phased approach with quasi-independent phases; protect life and materials science; maintain international agreements and capability; limit assembly flights to no more than four annually; and achieve first element launch, man-tended capability and permanently manned capability as early as possible.

The restructured program calls for the first element launch of the space station to be made in the second quarter of FY 1996 (January-March 1996), and man-tended capability to be achieved in the third quarter of FY 1997 (April-June 1997).

In the man-tended phase, astronauts brought up to Freedom by the Space Shuttle will be able to work inside the U.S. laboratory for periods of two weeks. They will return to Earth with the Shuttle. At this stage, one set of Freedom's solar arrays will generate about 22 kw of power with a minimum of 11 kw available to users. Six Shuttle flights will be required to achieve the man-tended configuration.

Freedom will achieve a permanently manned configuration in Fiscal Year 2000. This configuration will consist of the U.S. laboratory and habitat, as well as the European and Japanese laboratories; the Canadian Mobile Servicing System; accommodations for a live-in crew of four; and

three sets of solar arrays furnishing 65 kw of electrical power, with a minimum of 30 kw going to the users and the remainder to housekeeping chores.

A new requirement before permanently occupying the station will be the availability of an Assured Crew Return Vehicle to return space station crew members to the Earth in an emergency. Seventeen Shuttle flights will be needed to build the permanently manned configuration.

Provisions to expand the space station have been maintained. The follow-on phase of the Freedom program will include another solar array to achieve 75 kw, provisions for four additional crew members and could include additional capabilities such as a second preintegrated laboratory and additional nodes. This phase would use the new launch system for launch and assembly if the launch system is available.

The redesigned U.S. lab and hab modules are 27 feet long and 14.5 feet in diameter, about 40 percent shorter than the previous design. The smaller size allows the modules to be fully outfitted and tested on the ground prior to being launched into orbit. The U.S. lab module will hold a total of 24 8-foot wide racks, 15 of which initially are devoted to scientific work. At permanently manned capability, 28 experiment racks will be available to U.S. investigators: 12 in the U.S. lab, 11 in the ESA lab and five in the Japanese lab.

The redesigned truss segments will be built, preassembled and checked out on the ground. Formerly, the truss was to have been assembled, like a massive erector set, by astronauts performing space walks. NASA estimates the pre-integrated truss will cut assembly EVA by more than 50 percent.

While work on the Attached Payload Accommodations Equipment (APAE) suitable for large external payloads has been stopped, utility ports for small external payloads will be placed along the truss. The overall width of the station has been reduced from 493 feet to 353 feet.

Complexity of other station systems also has been reduced and where possible, hardware already flying on the Space Shuttle will be used in place of developing new hardware for the station. Also called for in the plan is the transfer of the Flight Telerobotic Servicer to NASA's Office of Aeronautics, Exploration and Technology. This, together with the deferral of the APAE, has eliminated the Goddard Space Flight Center's Work Package 3 from the Freedom program.

In addition to changes to the flight hardware, a number of changes to ground facilities are planned. The Space Station Processing Facility to be built at the Kennedy Space Center will not be fully outfitted, and a new hazardous processing facility has been deleted in favor of using an existing facility. The size of planned facilities at the Johnson Space Center -- the control center and crew training facilities -- have been scaled back. Payload facilities at Marshall Space Flight Center are being deferred and existing facilities will be used in the interim.

Due to funding cutbacks and hardware changes in the program, some layoffs of prime and subcontractor personnel have already taken place, and more are expected. At Work Package 1, no layoffs at the prime contractor, Boeing, are expected, but more than 500 people will be reduced from the subcontractor roles, some of which will be accommodated through transfers and attrition.

At Work Package 2, prime contractor McDonnell Douglas has already reduced its work force by about 160, with half that number being layoffs. Major subcontractors to McDonnell Douglas will be reduced by about 470, with layoffs accounting for approximately half of that, and another 200 will be reduced from supporting development, with about 65 of that total coming from terminations. At Work Package 4, no layoffs are expected, but as many as 40 people in support jobs at Lewis Research Center will be reassigned. Layoffs of about 30 percent of the work force at the Space Station Engineering and Integration Contractor, Grumman, were announced earlier this month.

Three photographs to illustrate this news story are available to media representatives from the NASA Headquarters Audio/Visual Section by phoning 202/453-8373.



Johnson Space Center
Space Station Projects Office

JSC/WP-2 Representatives/Alternates for Level II Reviews, Panels, and Working Groups



Tony Redding: FTS 525-5491

1/28/91

Reviews

Program Management Integration Review (PMIR)

Engineering Review (ER)

Integration Management Review (IMR)

Mission Integration Review (MIR)

Element Integration Review (EIR)

System Integration Review (SIR)

Panels

Safety and Product Assurance

Assembly Sequence and Stage Development
(Assembly Planning Review)

Meteoroid and Orbital Debris

Integrated Logistics (Ground Ops Integ)

System Design Integration

WP-2 Representative

KA/Carl Shelley
Ph. FTS 525-4095

KA/Tony Redding
Ph. FTS 525-5491

KA/Carl Shelley
Ph. FTS 525-4095

KC/Robert Rowley
Ph. FTS 525-0500

KA/Tony Redding
Ph. FTS 525-5491

KA/Tony Redding
Ph. FTS 525-5491

NA/John Blalock
Ph. FTS 525-6583

KC/Glen Cress
Ph. FTS 525-0414

ET/Ray Nieder
Ph. FTS 525-8401

KC/Robert Newlander
Ph. FTS 525-0825

KC/Alan Lindenmoyer
Ph. FTS 525-0008

Alternate

KA/Tony Redding
Ph. FTS 525-5491

KC/Denny Holt
Ph. FTS 525-5822

KA/Tony Redding
Ph. FTS 525-5491

KC/John Mitchell
Ph. FTS 525-0519

KC/Denny Holt
Ph. FTS 525-5822

KC/Denny Holt
Ph. FTS 525-5822

NA/Gary Johnson
Ph. FTS 525-4136

KC/Keith Reiley
Ph. FTS 525-0826

KC/Dale Haines
Ph. FTS 525-0425

KC/John Mitchell
Ph. FTS 525-0519

KC/Arthur Bond
Ph. FTS 525-0037

Enclosure



Johnson Space Center
Space Station Projects Office

JSC/WP-2 Representatives/Alternates for Level II Reviews, Panels, and Working Groups



Tony Redding: FTS 525-5491

1/28/91

Panels (cont'd.)

Redundancy Management

Environments

Mission Operation Integration

Element Design Integration

Avionics S/W and H/W Integration

Sub-Panels

Station Communications and Data (SCADSI)

Station Operations Techniques

Working Groups

Ground Support Equipment (GSE)

Robotics

In-Flight Maintenance

Communications and Tracking

WP-2 Representative

KC/Cathy Kramer
Ph. FTS 525-4207

ES/Lubert Leger
Ph. FTS 525-8916

KC/Karen Clark
Ph. FTS 525-0514

KC/Elizabeth Smith
Ph. FTS 525-0427

KA/Carroll Dawson
Ph. FTS 525-0048

KG/Allen Baker
Ph. FTS 525-5917

KC/Keith Reiley
Ph. FTS 525-0826

KB2/Jerry Elliott
Ph. FTS 525-0819

KC/Henry Kaupp
Ph. FTS 525-0022

KC/Barry Boswell
Ph. FTS 525-0382

EE/Sid Novosad (Chr.)
Ph. FTS 525-0216

Alternate

KC/Robert Hahne
Ph. FTS 525-3063

KC/Dale Haines
Ph. FTS 525-0425

KC/Robert Hahne
Ph. FTS 525-3063

KC/Arthur Bond
Ph. FTS 525-0037

KG/Walter Marker
Ph. FTS 525-0117

DJ/Thomas Ohnesorge
Ph. FTS 525-7003

KC/Glen Cress
Ph. FTS 525-0414

KB2/Robert Robinson
Ph. FTS 525-0036

KC/Barry Boswell
Ph. FTS 525-0382

KC/Robert Hahne
Ph. FTS 525-3063

EE/Mel Kapell
Ph. FTS 525-0116



Johnson Space Center
Space Station Projects Office

JSC/WP-2 Representatives/Alternates for Level II Reviews, Panels, and Working Groups



1/28/91

Tony Redding: FTS 525-5491

Working Groups (cont'd.)

Mechanical Systems*

EVA

Loads and Dynamics

Thermal Control (TCS)

Interface

Man-Systems (MS)

Guidance, Navigation and Control (GN&C)

Environmental Control/Life Support (ECLS)

Fluid Management (FMS)

Data Management (DMS)

Electrical Power (EPS)

WP-2 Representative

—

EC/Steve Porter (Chr.)
Ph. FTS 525-9239

KC/Alan Lindenmoyer
Ph. FTS 525-0008

EC/James Jaax (Chr.)
Ph. FTS 525-9127

KC/Arthur Bond (Co-Chr.)
Ph. FTS 525-0037

SP/James Lewis (Chr.)
Ph. FTS 525-3627

EG/Paul Kramer (Chr.)
Ph. FTS 525-8240

EC/Donald Price
Ph. FTS 525-9237

EP/Scott Baird
Ph. FTS 525-9013

KA/Carroll Dawson (Chr.)
Ph. FTS 525-0048

EP/Robert Egusquiza
Ph. FTS 525-8284

Alternate

—

EE/Michael Lawson
Ph. FTS 525-9124

KC/Ken Demel
Ph. FTS 525-0013

EC/Richard Parish
Ph. FTS 525-9197

KC/David Glock
Ph. FTS 525-7983

SP/Gary Kitmacher
Ph. FTS 525-3745

EG/James Blucker
Ph. FTS 525-8181

KB2/Dean Thompson
Ph. FTS 525-0017

EP/Don Blevins
Ph. FTS 525-9023

KG/Walter Marker
Ph. FTS 525-0117

KB2/Ervin Emanuel
Ph. FTS 525-6217


*need to review the necessity of this working group

JET PROPULSION LABORATORY**INTEROFFICE MEMORANDUM**

311.4-672

15 April 1991

TO: Distribution

FROM: Lori L. Paul 

SUBJECT: Space Station Team Meeting Minutes for 15 April 1991

PRESENT: Rob Staehle, Bob Aster, Randy Cassingham, Paul Henry, Chuck Ivie, Henry Kleine, Lori L. Paul

Next Meeting: 22 April 1991 at 10:30 in 601-243

Rob Staehle

The National Space Development Agency of Japan has assigned Hidetoshi Murayama as Deputy Director of the [Japanese] Space Station Program Department and acting Director of the Office of Space Environment Utilization Promotion (replacing Kazuo Matsumoto).

Copies of recent (March 1991) correspondence between National Research Council Chairman, Louis J. Lanzerotti; NASA Administrator Richard H. Truly; and Vice President Dan Quayle regarding the purpose of the Space Station and the progress of the program are available from L. Paul x4-1166.

A meeting was held on 3 April at JPL between Rob, Bob White/784, Jeff H. Smith/311, Don Lewis/355, Jim Doane/311, and Paul Wiener/310 to discuss a Division 31 managed task that will define mission success guidelines and acceptable risk factors for OSSA payloads on the Space Shuttle, Space Station, and other carriers. Jeff H. Smith will lead the task. Rob intends to discuss participation of Division 52 with Gerry Murphy/521.

The following excerpt, concerning plume load assessment, was read from the minutes of the Program Managers Review (14 February 1991):

"[Mr. Dagen, Chairman of the Loads and Dynamics Working Group] stated that the current Photovoltaic (PV) array mast design limit capability is about 30K inch-pound (in-lb) of base moment, which includes a 1.5 load uncertainty factor. The PV array blanket moment equivalent limit load capability is about 8K in-lb. He noted that the current Space Station Freedom configuration generated plume loads of the PV array, if no operational constraints are imposed, of about seven to nine times the 30K in-lb capability...various Space Shuttle and Space Station Freedom design and operational modifications have been proposed, and are being evaluated, to alleviate the problem...

...The application of [the PV array design decision matrix] resulted in a PV array design proposal which uses a combination of PV array feathering for [Permanent Manned Capability] and potential retraction for early mission builds, as a prudent planning guide...

Mr. Dagen...recommended the commission of a plume loads verification plan; and the baselining of PV feathering as a load reduction technique, with retraction as a backup for major system failure or early mission build load exceedance [sic]."

The Third International Conference on Engineering, Construction and Operations in Space (sponsored and organized by the Aerospace Division of Civil Engineers) has published a call for papers. The deadline for abstracts is 1 June 1991. The conference will take place on 31 May through 4 June 1992. Contact Rob for a copy of the announcement.

A Systems Integration Review was held in Reston on 19 March. A discussion of environments planning through the Integrated System Critical Design Review (ISCDR) took place. Rob read the following portion of the review minutes which may relate to Gerry Murphy's task:

"[W. Geisel, JSC] presented the external induced Particles and Waves (P & W) Environment effects activities planning through ISCDR. External induced environments include: (1) Electromagnetics, (2) Ionizing radiation, (3) Plasma, and (4) Electrostatic buildup and discharge.

...The plan is to submit a Change Request (CR) to baseline Electrostatic Discharge (ESD) control requirements by June 1991. A CR to baseline 30246 Electrical and Electronic Material and Process Standard is to be submitted by May 1991. CRs baselining Ionizing Radiation Effects (IREs) and Plasma Effects (PEs) requirements are also planned. A grounding decision methodology based on the Electrical Grounding Tiger Team experiment data and test results is scheduled for completion by June 28, 1991. There will also be an assessment of the [Manned Tended Configuration] Environmental Effects Design Controls using all available data..."

Robert Moorehead has sent out an announcement that Richard Thorson will be the new Acting Manager of the Program Engineering Office. J. Larry Crawford will serve as Acting Deputy Manager, and Ron McCullar will be the Acting Associate Manager. Thorson is currently the Manager of the Program Integration Office, and as such will manage both organizations pending formal approval of a combined System Engineering and Integration Office.

Paul Henry

Drafts of the user entry policy and roles and responsibilities of Code MU and user sponsoring organizations have been delivered to Barry Epstein/MU for approval.

Paul attended the Evolution Working Group (EWG) meeting on 4 and 5 April 1991 in Reston. Paul described at length new (post restructure of the Space Station) pre-integrated truss design, module options, and other topics covered by the EWG meeting.

Paul Henry has submitted the following EWG viewgraph packages to the JPL Space Station Library (contact L. Paul at x4-1166 for copies. Note: Viewgraph packages were presented at the EWG meeting on 4 and 5 April 1991 unless otherwise indicated):

"Space Station Freedom Technology Requirements Assessment, Overview of Progress to Date," Peter Ahlf/NASA, March 1990

"Space Station Freedom Evolution Requirements Review," Donald W. Monell/LaRC

"Space Station Freedom Module Pattern Growth Concepts," Marston Gould/LaRC

"Growth of Pre-Integrated Truss," Ken Sheppardson/LaRC

"LTV Assembly Servicing Facility," Erlinda Kiefel/Martin Marietta

"Evolution Requirement Descoping for the Restructured Space Station Freedom Program," Barry Meredith/LaRC

"SEI Presentation," Doug Kirkpatrick/NASA

"Evolutionary Maintenance Requirements for Space Station Freedom," Jennifer Green, Rudy Saucillo/McDonnell Douglas Space Systems Company

"Safety Analysis of Cryogenic Propellant Operations at SSF," Lewis Research Center

"SEI Human Support Program SSF Requirements [DRAFT]," John Bosley/NASA

"Space Station Restructuring -- Man-Tended Capability, Permanently Manned Capability," Donald W. Monell/LaRC

"Headquarters Perspective [on Evolution Requirements]," Peter Ahlf/NASA

"SSF Strategic Planning," NASA

"Advanced Automation for In-Space Vehicle Processing, Study Status," M. Sklar/McDonnell Douglas Space Systems Company, Tom Davis/KSC

"SSF Evolution Configuration Assessment, A Structured Figure of Merit Approach," William M. Cirillo/LaRC

"Office of Space Flight Technology Requirements, A Status Review," Dr. Lenoir/NASA, 11 February 1991

Communications Analysis Team (Bob Aster)

The CAT is using FROST to model end-to-end performance for the Station's information system as loading increases, building from the lower bound determined with static analysis. Latency forecasts will be forthcoming in a few weeks. Little definition is available for the Data Interface Facility (DIF), Space Station Control Center (SSCC) and Payload Operations Integration Center (POIC). Chuck mentioned that one-way latencies of up to 8 seconds have been reported during Shuttle operations for the Mission Control Center.

Henry Kleine

FROST is in the process of closeout, which should be complete by end of April. Henry will continue to seek new applications and funding for FROST. There seems to be widespread interest in FROST, but no immediate funding for further development.

Upcoming Meetings

April 26-28: External Environment (topic: ionizing radiation) meeting at MSFC. Gerry Murphy to attend.
August 6-8: Second Evolution Symposium: "Beyond the Baseline '91" at the South Shore Harbour in League City. Paul Henry and Jeff H. Smith to attend.

Recent Space Station-related Items from Code P's "Daily News In Brief" (Typos *not* corrected...)

Philadelphia Inquirer -- 4/3/91

"GOING ON THE CHEAP INTO SPACE" By Daniel Greenberg (a column)

"From the perspective of space enthusiasts, a useless space station is better than no space station at all. And so NASA is moving ahead with plans for a celestial motel, Space Station Freedom, while scientists who have been designated as its prime users try to explain that it just won't do."

Greenberg writes that confusion and contention of this nature are normal in space politics -- only in this case its on a commensurate scale with the space station. He continues, stating that the only agreement reached so far among the various constituents of the station is that it won't satisfy any of them.

Greenberg writes that the highest priority, now, for the station is the biological research which would support long-duration human habitation or trips in space. However, Greenberg states that the station, as presently reconfigured to agree with White House, Congressional and other considerations, won't support this high priority research in a proper-enough fashion to allow any real understanding of the long-term effects to be gained.

He says the dilemma is that the cheap version of the station won't do, but there isn't enough money to do it right. He says that the prudent thing to do would be to wait till there are enough funds to do it right.

USA Today -- 4/4/91

"TEACHER FROM USA COULD BE COSMONAUT" By Paul Hoversten

"The first U.S. teacher in orbit may accomplish the feat aboard the Soviet space station Mir -- not NASA's space shuttle -- on a 1993 mission."

The paper says the program will be announced today in New Orleans at the start of the National Congress on Aviation and Space Education and quotes a spokesperson for the meeting as saying "this is a golden opportunity for education. It's not in any way a program for one country to beat the other."

The story says NASA's attempt to fly a teacher in space aboard the shuttle has been on hold since the 1986 Challenger explosion killed schoolteacher Christa McAuliffe and six others.

The paper says the Soviet program has caught NASA and backup-teacher-in-space Barbara Morgan by surprise. The story quotes Morgan as saying "Amazing, that's the way it goes, I guess. If this is going to highlight good teachers and education in space, I say more power to them."

The story says the teacher, and a backup, will be selected this fall after a search in the U.S. for qualified candidates. The paper says that NASA's decision to fly Morgan, or not, will not be based on what others are doing but rather on the merits of the case at the time.

Washington Post -- 4/9/91

"TEST DRIVING GO-CARTS ABOVE EARTH" By Kathy Sawyer

"Spacewalking Atlantis astronauts rode the rails in orbit yesterday, test driving go-carts for hard-hats who may use the equipment to assemble NASA's planned manned space station."

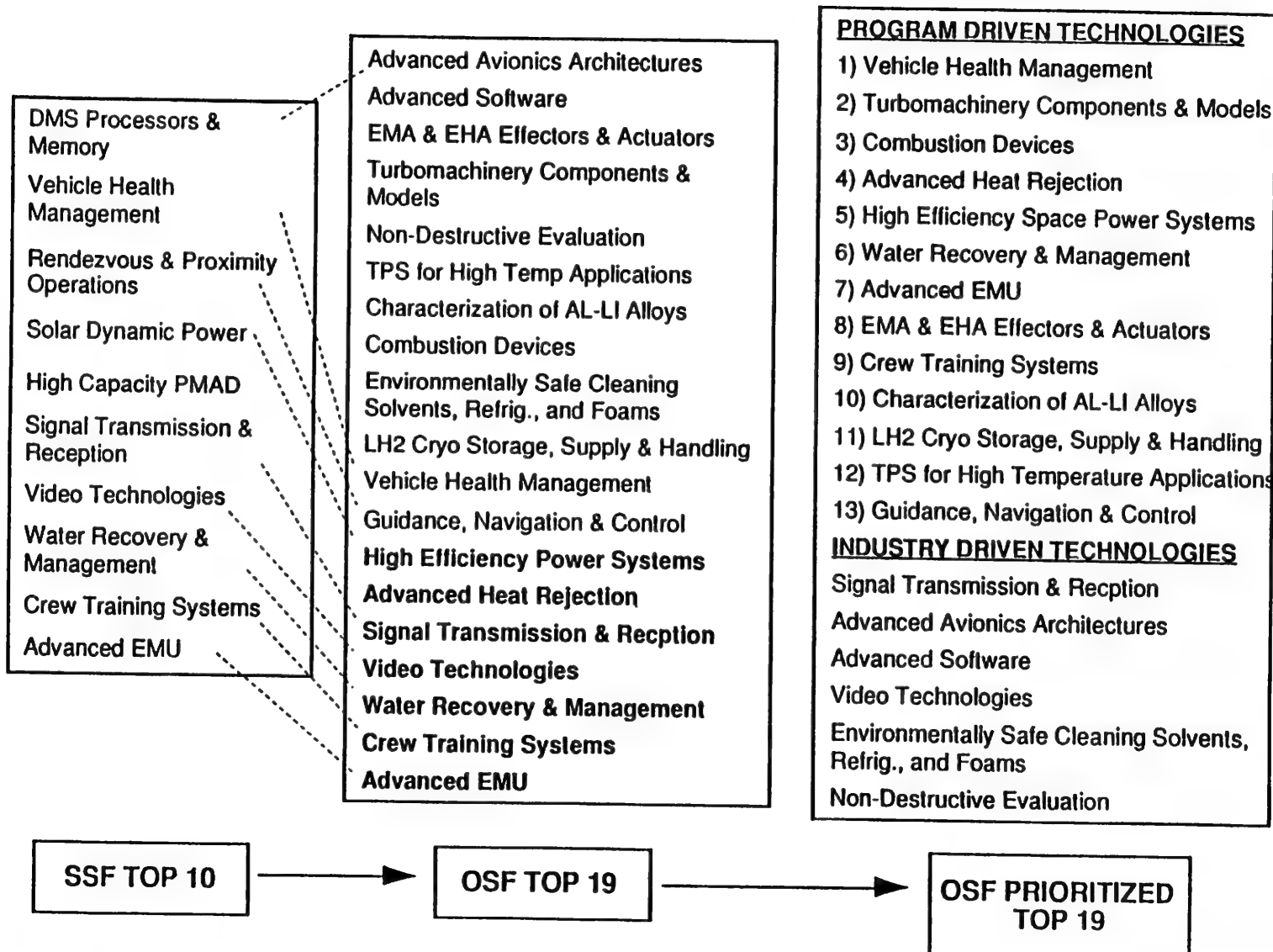
The Post reports that after floating out of the shuttle's cabin in their \$2 million space suits, astronauts Jerry Ross and Jay Apt spent an hour assembling a 47 foot mini-Metrorail along one side of Atlantis' 60 foot long cargo bay. The story says that during the duo's 6.5 hour outing, they tested three kinds of carts, a tether and other equipment, and also rode the orbiter's robot arm in "cherry picker" fashion.

The article says that the test was designed to evaluate a variety of hardware under consideration as aids in the eventual assembly of the space station. The story says the exercise was also intended to rebuild languishing astronaut spacewalk skills which have gone unattended to in nearly six years.



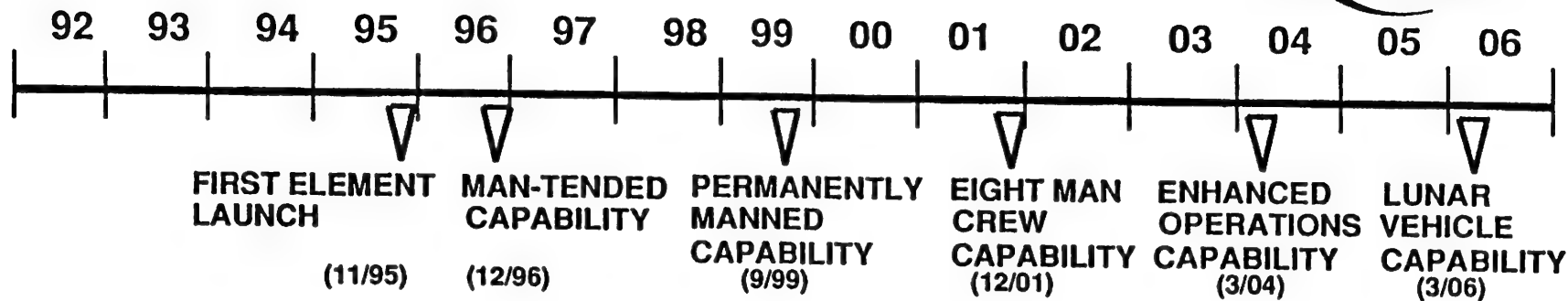
SSF TECHNOLOGY REQUIREMENTS ASSESSMENT

OSF TECHNOLOGY PRIORITIES





SPACE STATION FREEDOM MAJOR MILESTONES



MAN-TENDED OPERATIONS



"FOLLOW-ON PHASE"

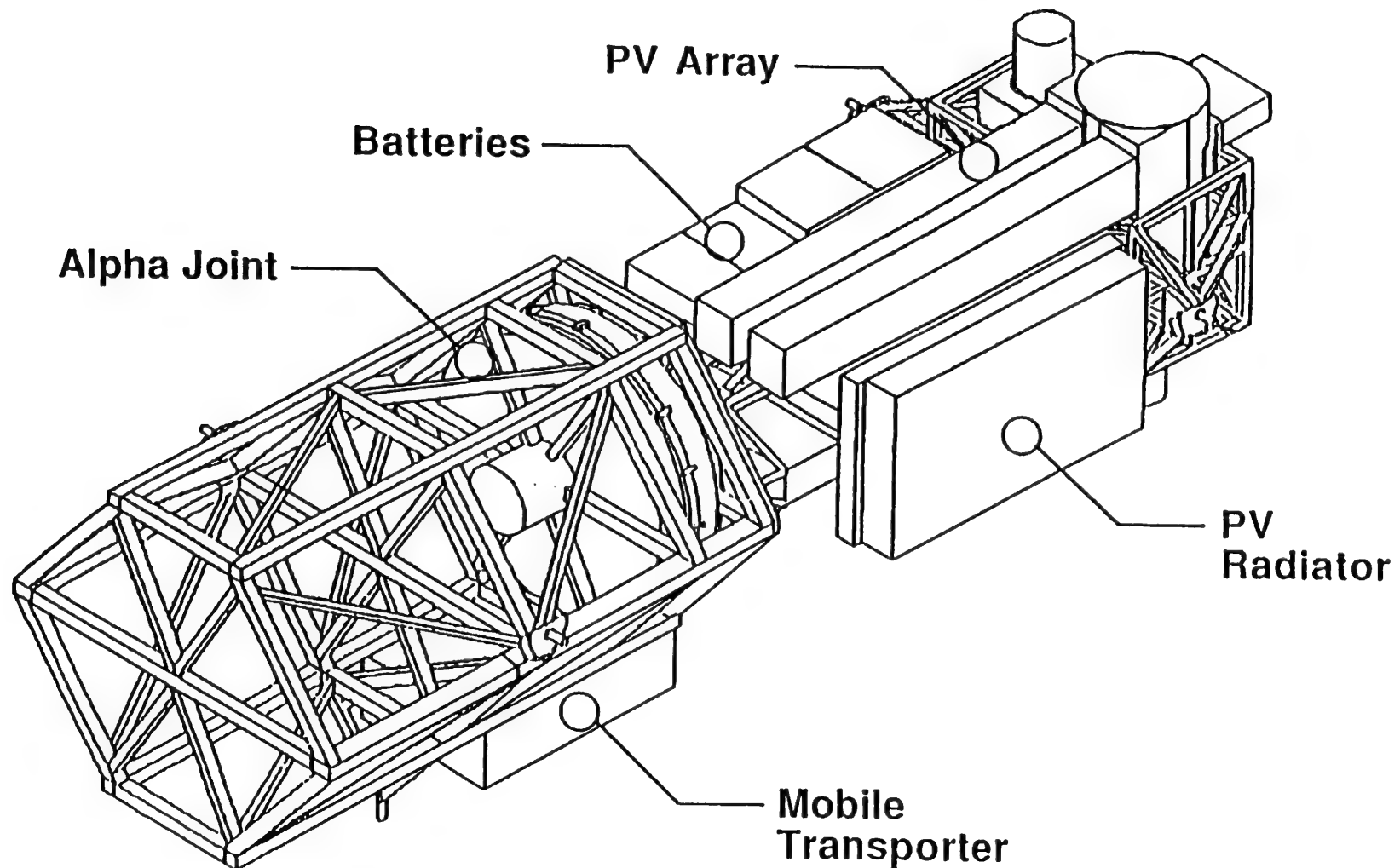


(MODERATE GROWTH ASSUMING
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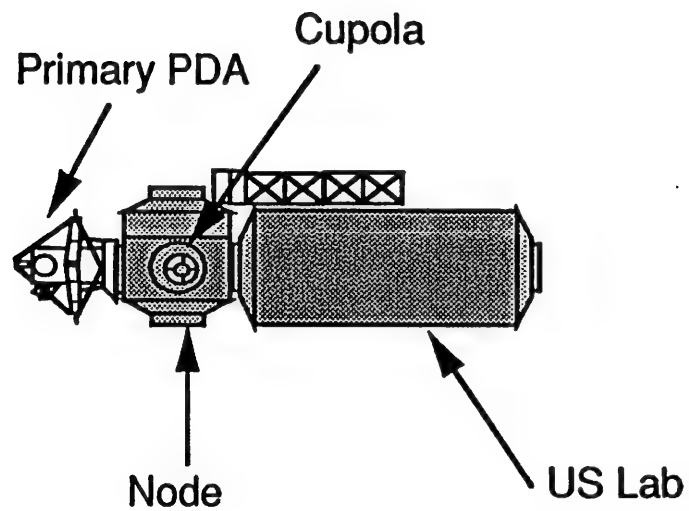


Detail of Section MB-1

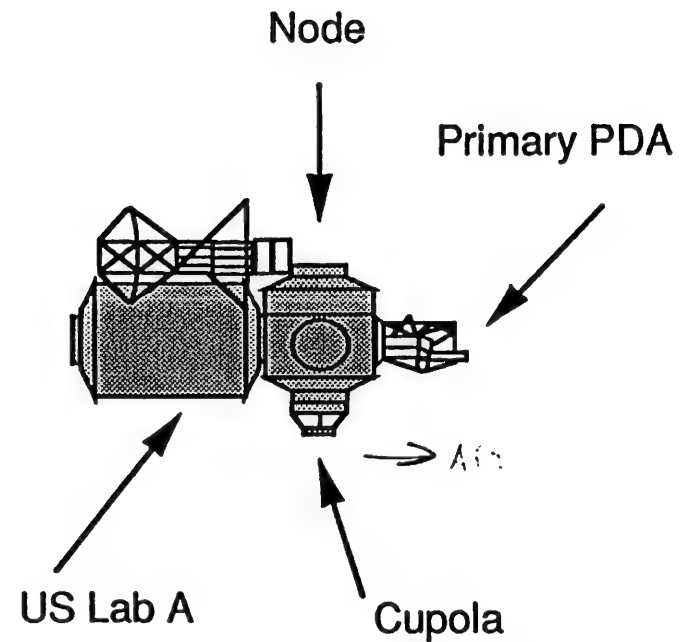
(Pre-Integrated Truss)



Man Tended Capability Module Pattern

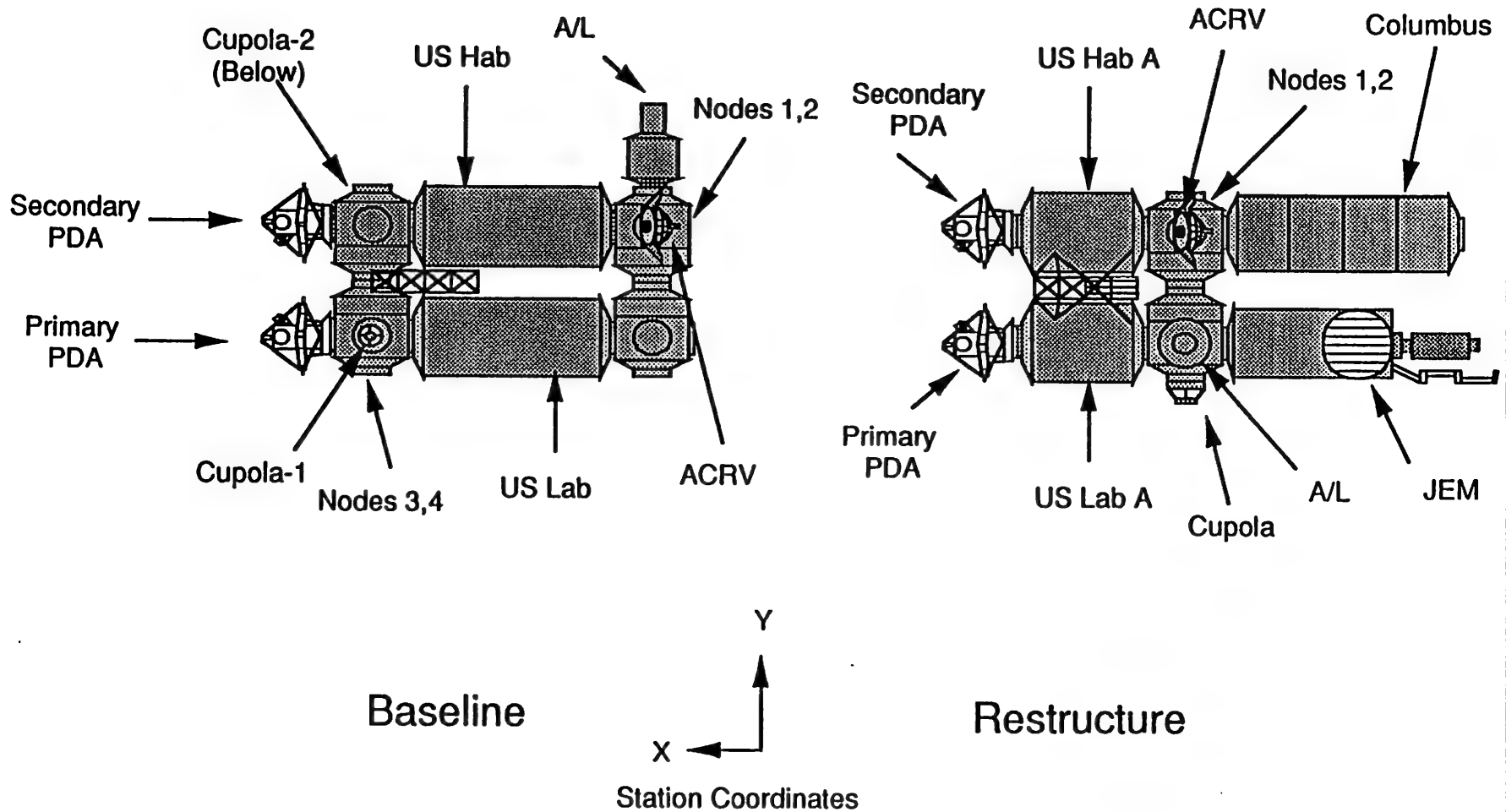


Baseline

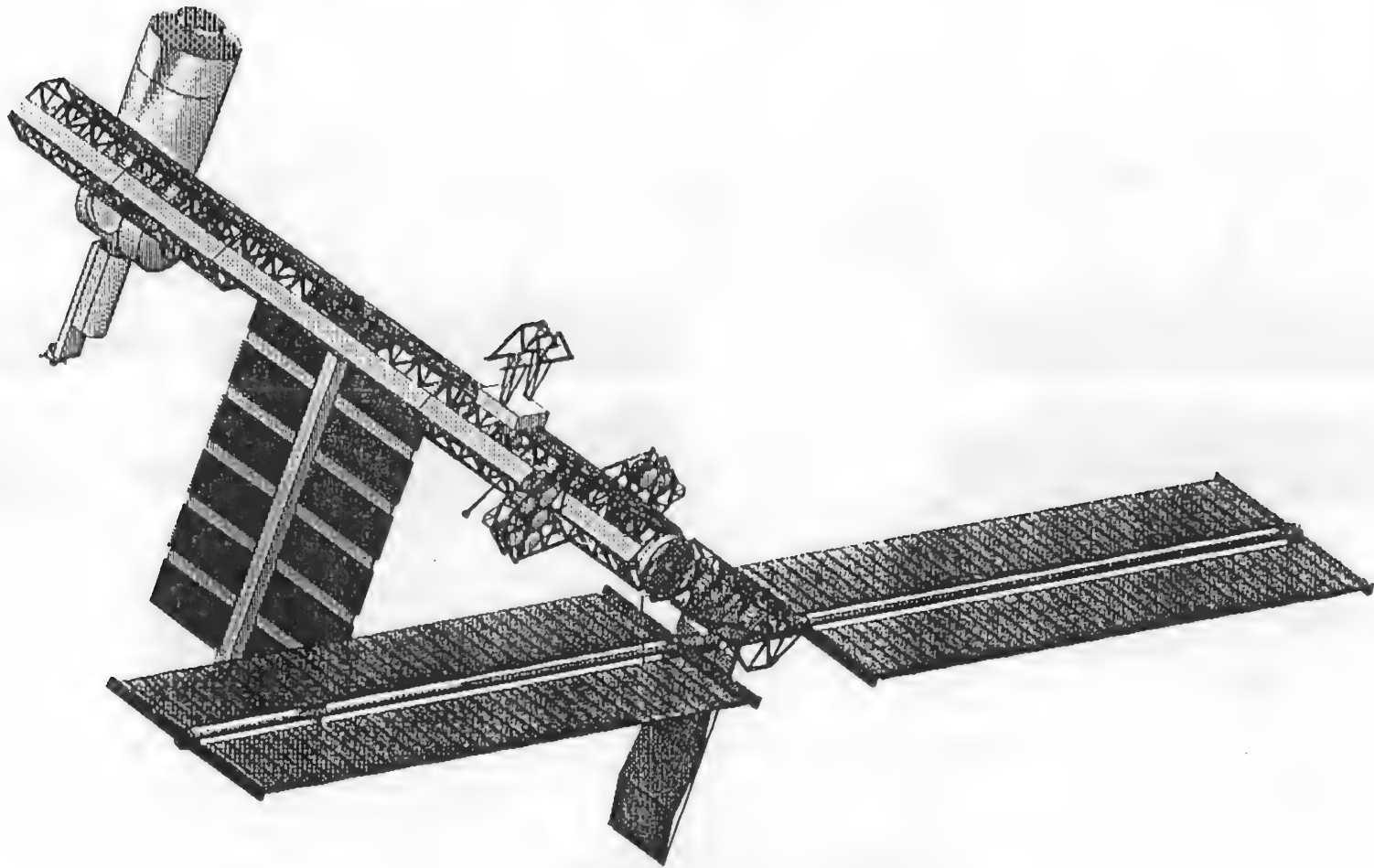


Restructure

Permanently Manned Capability Module Pattern



Man-Tended Capability




LaRC SSFO

311.4-683

6 May 1991

TO: Distribution

FROM: Randy Cassingham 

SUBJECT: Space Station Team Meeting Minutes for 6 May 1991

PRESENT: Rob Staehle, Bob Aster, Randy Cassingham, Paul Henry, Chuck Ivie

Next Meeting: 13 May 1991 at 10:30 in 601-243

Rob Staehle

Bob Easter/JSO gave perhaps the "last report" of the JPL Systems Office to the JPL Director's Review and Discussion meeting last week. He reported on some lessons learned, and how JPL might best make use of those lessons to maximize our return from the Space Station. Bob's impression is that the Station will survive the recent political and budgetary battles and be built. Nearly all of the JPL-employed JSO personnel that "wished" to be reassigned have been; 15 have been attached to the Flight Project Office for two-year detailee stints with Space Station. Anita Adams has accepted a position in Section 363; other dispositions will be known soon.

Rob received a copy of interesting letter from Mary Kicza/SNC (acting chief, Flight Programs Branch, Microgravity Science and Applications Division). Kicza wants the DPM-3 to Space Station *Freedom* transition study to continue, though it is not formally a part of the OSSA 91-2 traffic model. Don Lewis and Hershal Fitzhugh will support the effort.

Terry Scharton, Neil Divine and Guy Spitale (all of Section 521) have come up with a clever concept for the acoustic monitoring of micrometeoroid and debris impacts on the modules using several microphones. Impacting objects will first hit a debris shield, and then gas and plasma generated by the impact will spray onto the underlying module shell with less effect than a direct impact. Triangulation using the microphones' could help determine the location of the impact, and the intensity of the sound could give a rough approximation of the severity of impact and the size of the particle. They will be writing a white paper on the concept for Code Q.

Tim O'Donnell/355 is also doing some Code Q work, a broad survey of NDT, radiation and atomic oxygen degradation, and other aspects of the Station's overall safety.

Wallace Tai/318 has completed a WPA for a remote instrument operations study for the SUM (Science Utilization Management) team to determine what is required for the operation of Space Station-based payloads such as the Microgravity Containerless Processing Facility from, say, the Pasadena area.

Jeff H. Smith/311 has prepared a draft RTOP for OSSA describing a task to prepare mission success guidelines for acceptable risk. This would be OSSA-wide -- not necessarily limited to Space Station payloads -- but would certainly include Station payloads. Bob White will be overseeing the technical work.

Hershal Fitzhugh has reviewed a KSC document on payload processing requirements. While he found the document very complete and well done for a first draft, he noted that electrostatic discharge requirements were neglected. He also noted that the proposed use of air bearing pallets would likely be inconsistent with proposed cleanroom requirements as the air blasts tend to lift any dust on the floor into the air.

Dennis Kern has completed his statistical energy analysis model of the Space Station Hab module's (pre-reconfiguration) vibroacoustic environment. His report notes that VAPEPS (the Vibroacoustic Payload Environment Prediction System) has been accepted as the common tool for Space Station noise and microgravity predictions. "The VAPEPS analysis of the Space Station Habitation Modules shows that neither microgravity nor noise requirements can be achieved without substantial effort." VAPEPS shows that fan noise levels are more than 10 db to 20 db higher at some frequencies than proposed standards.

Rob will be meeting with Bob Easter and Charles Elachi on Thursday to discuss scientific uses of the Station.

A meeting was held at JPL in mid-April with Canadian robotics experts. Now that the Flight Telerobotic Servicer is out of the Program, we will depend more on the Canadian special purpose dexterous manipulator and associated equipment for robotic manipulation outside the Station. As described by Wayne Schober, JPL has developed "accommodation control" -- a local feedback loop for the robotic arm to help smooth out overcontrol (i.e., without having to send feedback to the ground and wait for a corrective response, which could take many seconds to accomplish). The Canadians were very open with their progress and very receptive of our input.

Chuck Ivie

Mary Kicza called Chuck to get information on information system requirements from a user perspective. She's looking at requirements for materials processing, especially microgravity related processing. She asked him to also send this information to Gary Martin/SN, who is working on user support in relation to information systems.

Chuck was asked to assist the Department of Energy in looking at the Hanford nuclear facility; Chuck thinks that there might be good applications there for instruments developed for space uses, just as there are good applications possible the other direction, for instruments to detect hazardous materials in the Station's internal environment.

Paul Henry

Paul is working with Barry Epstein/MUU to start another iteration in the development of user entry policy and roles and responsibilities of Code MU and user sponsoring organizations. Paul is preparing an updated task plan as requested by Remer Prince/MUU last week.

The funding for the Evolution Working Group FY91 support has arrived.

Communications Analysis Team (Bob Aster)

An update to the latency study has been released. It includes parametric examinations of traffic size and storage, and points out areas for further study. The majority of the latency (about 2.0 seconds) is in the ground segment -- the DIF (Data Interface Facility), POIC (Payload Operations Integration Center) and SSCC (Space Station Control Center). Up to 8 seconds of latency may be added to this from other areas, depending on loading and paths used. Most of the effort so far has been done on the space segment of the communications path; the ground segment needs further definition and -- when that is completed -- further study. Copies of the study report are available from Bob.

Randy Cassingham

Randy has started work on the rewrite of the *Introduction to Utilizing Space Station Freedom* document for Code MU. One of the interesting "unknown" tidbits he has found in the documentation is that the private crew quarters have been deleted from the habitation module -- apparently permanently. This is especially interesting in light of the high noise levels in the modules being predicted by VAPEPS. Six months may seem like a very long time for the astronauts....

Upcoming Meetings

August 6-8: Second Evolution Symposium: "Beyond the Baseline '91" at the South Shore Harbour in League City. Paul Henry and Jeff H. Smith to attend.

Recent Space Station-related Items from Code P's "Daily News in Brief" (Typos *not* corrected...)

Washington Times -- 4/17/91

"NASA LEFT OUT BILLIONS IN SPACE STATION PLAN"

"NASA's top officials conceded under Senate questioning yesterday that their plan to trim the cost of a proposed space station neglects billions of dollars in 'add ons' that will be needed."

The Times quotes Senate subcommittee chairman Albert Gore as saying "I have trouble with this. We've had the experience in the past of being surprised by a demand from NASA for more money to accomplish the same thing that we thought could be funded by lower amounts."

Washington Post -- 5/1/91

"GAO SAYS NASA UNDERSTATES REVISED STATION COSTS" By Kathy Sawyer

"NASA is understating the cost of building its recently redesigned space station Freedom by \$10 billion, and the cost of operating it through the year 2027 by about \$24 billion, according to a General Accounting Office report to be released today."

The Post states that the GAO report indicts NASA's accounting methods, which it says have long been a subject of controversy among members of Congress. The Post says that NASA admits that its methods omit from the space station program budget such key items as scientific devices and crew rescue vehicles.

The paper says the report, which it obtained early, is to be the subject of a congressional hearing scheduled today by Rep. Barbara Boxer, chairman of the subcommittee on government activities and transportation.

The article says the GAO report cites a figure of \$40 billion for a space station through the time it would be permanently occupied and an operating figure of another \$78 billion for 27 years of operations. The paper says the GAO report differs with NASA by as much as \$24 billion over the 27-year operating period and that the GAO accuses NASA of failing to cost out the improvements the agency has said it would implement once the station is permanently occupied.

The Post quotes from the report, which states "the increased costs coupled with the diminished capabilities raise questions about the relative value of the station." The Post says the report also recommends that Congress "continually examine the space station program from the standpoint of schedule, risk, cost, merit and affordability."

Associated Press -- 5/1/91

"QUOTES FOR THE DAY"

"I believe that the \$30 billion NASA estimate will get us a garage in space with nothing in it and nothing happening around it." -- Barbara Boxer, D-Calif., Chairwoman of a House Government Operations subcommittee, on the cost of building and operating a space station."

Washington Post -- 5/2/91

"NASA DEFENDS SPACE STATION COST ESTIMATE" By Kathy Sawyer

"In a sometimes contentious hearing, NASA Administrator Richard R. Truly yesterday defended his agency against charges by the government's top auditor that it has understated the cost through 2027 of the planned international space station by at least \$34 billion."

The Post says that Truly told the hearing that NASA's accounting practices conform to the agreement that NASA has come to over the years with the Congress and that NASA is reporting all relevant costs whether they are attributed to the station program or not.

The paper says that Truly tried to head off subcommittee proposals for more reviews of the space station, citing the numerous studies which have already been done.

The story quotes the subcommittee chairman, Barbara Boxer, D-Calif., as saying "taxpayers deserve to know precisely how much of their tax dollars are going toward the space station program."

New York Times -- 5/2/91

"NASA SAYS IT IS TIME TO BUILD SPACE STATION" By Warren Leary

"The space agency, bombarded by conflicting cost estimates for a planned space station and continued disagreement among scientists about its usefulness, said today that it was time to stop studying the proposal and to build it."

The Times reports that agency head Richard Truly told a Congressional hearing yesterday that the space station program has finally achieved a stable configuration and funding and that it was time to move to construction.

Washington Post -- 5/3/91

"HOUSE VOTES \$2 BILLION FOR SPACE STATION"

"The House yesterday, on a 361 to 36 vote, authorized NASA to spend \$14.9 billion next year."

The Post says that the House bill is lower by \$500 million than President Bush had requested but that the funding bill contains the full \$2 billion Bush sought for the international space station Freedom.

The story says that the House, concurrently, asked the National Academy of Sciences to study whether the goals of the space station can be achieved more cheaply by other means.

The story says that some leading scientists have said the space station is inadequate to achieve the scientific purposes for which it is being built and that its scientific returns will not justify its high cost. The story quotes Representative Dick Zimmer (R-N.J.) as saying "the study will determine which group is right."

Space Station Utilization Team Weekly Meeting Minutes
For additions or changes to this list, contact Randy Cassingham

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Total: 89 (62 paper, 27 NASAmail) * Printed 7 May 1991

JET PROPULSION LABORATORY**INTEROFFICE MEMORANDUM**

311.4-693

13 May 1991

TO: Distribution

FROM: Lori L. Paul 

SUBJECT: Space Station Team Meeting Minutes for 13 May 1991

PRESENT: Rob Staehle, Bob Aster, Hershal Fitzhugh, Chuck Ivie, Lori L. Paul

Next Meeting: 3 June 1991 at 10:30 in 601-243

Note: Due to the travel of team members and the Memorial Day holiday (27 May), the next meeting will be on 3 June.

Rob Staehle

Gloria Badilla/521, Dennis Kern/521, and Tom Bergen/521 will be presenting "Using VAPEPS [Vibroacoustic Payload Environment Prediction System] for Noise Control on Space Station Freedom" at the International Conference on Environmental Systems (8-11 July 1991) in San Francisco. For their study, ventilator fans were used as the main source of noise in the habitation module. MSFC and Boeing recommended the particular fans used for the study, which were off-the-shelf ventilator fans from fighter aircraft. Concern was expressed that these fans would be far too noisy for the habitation module; however, MSFC and Boeing claimed that other fans would be too costly. Additionally, there are no current specifications for the size of ventilator ducts, so the study assumed a duct diameter of 8 inches. This duct size may be too large.

Chuck Ivie/311 mentioned that other environmental issues are of growing concern, such as the quality of lighting in Station modules.

Robert H. Benson/SM has requested that Code SM support two new Space Station-related tasks:

- Evaluate opportunities for remote operations interactions with restructured Space Station systems. Rob will ask Wallace Tai/317 for a proposal to augment his SUM (Science Utilization Management) task, which may relate to Wayne Schober/881's work on telerobotic control.
- Incorporate the results from earlier OSSA Space Station external contamination studies into restructured Station contamination models. Gerry Murphy/521 will lead this task.

"The First International Design for Extreme Environments Assembly (IDEEA)" convention will take place at the University of Houston Hilton Hotel on 12-15 November 1991. The convention will involve construction techniques, energy systems, automation and robotics, life support, waste disposal, transportation, safety, and human factors issues for extreme environments such as outer space; polar regions, deep desert, submarine, high altitude, and underground (mine and tunnel) locations. For additional information, contact the IDEEA One Program Office, College of Architecture, University of Houston, Houston TX 77204-4431, (713) 749-1181/FAX (713) 747-6230.

Issues of "Station Break" have been oddly absent for several months. Last week the January through April issues arrived in a single envelope (!). Contact L. Paul at x4-1166 to borrow copies of these belated issues.

Chuck Ivie

There has been general concern that Reed-Solomon encoding would be eliminated from the reconfigured Space Station. After several calls, Chuck determined that Reed-Solomon encoding has been restored to the baseline restructure of the Space Station. Apparently, all former cost related objections to Reed-Solomon encoding have been dropped.

Chuck is investigating the feasibility of using existing commercial communications satellites to supplement the service of TDRSS for space-to-ground data links. The cost of utilizing the satellites for Space Station appears to be very economical. For example: prime time, dedicated (uninterruptable) service on Ku-band transponders typically costs \$365 to \$475 per hour; C-band transponders average \$320 to \$340 per hour (see info. and price lists attached to the minutes).

Current aircraft operations utilizing communications satellites would be somewhat analogous to the use of satellites by the Space Station. Equipment is being offered by commercial vendors that allows aircraft to use 24 voice channels (approximately equivalent to a T carrier) in two-way communication via existing satellites. Communications equipment for a Concorde or 747 aircraft, consisting of a steerable phased array which can transmit and receive 1.554 megabits per second with 20-30 watts of power, costs approximately \$800,000. Such equipment masses about 50 kilograms. Theoretically, similar equipment might be attached to the outside of the habitation module. The system would be frequency agile and the same antennae could be use to track several satellites at once.

Communications satellites exist in sufficient numbers and orbital positions to provide complete coverage for the Space Station. There are approximately 11 Ku-band and 15 C-band satellites with transponders available over the continental United States alone. An extensive Ku-band satellite network is being established by Hughes Communications. More specific documentation from Hughes is expected. By the end of May, Chuck will deliver a white paper on this topic to Angie Johnson/MSU and others.

Bob Aster

The Communications Analysis Team (CAT) is currently a "skeleton crew" consisting of B. Aster and J. M. de Pitahaya.

J. M. de Pitahaya has raised concerns regarding the use of X-Windows as the display manager onboard the Station. Experience at JPL with X-Windows on IBM PC-class computers indicate that it is a "memory hog" which requires 3 or 4 megabytes of RAM as a minimum for its basic operations and may need tens of megabytes on disk drives to support complete functionality of the program. The computers planned for the Space Station contain sufficient RAM to host X-Windows, but will probably need to reserve a portion of that memory for other functions. Further, currently planned Station PCs will not have disk drives. Any effort to host X-Windows on disk drive memory as a substitute for RAM would result in exceedingly slow operation of the program, as would accessing remote disk drives over a LAN for display functions.

Hershal Fitzhugh

Fitz has been attending several Small Rapid Response (SRR) payload telecons. Specifications for exactly what constitutes a SRR payload have been under discussion. Some feel that SRR payloads will provide the most immediate and impressive science results for the Space Station.

Attached to the minutes are excerpts from the viewgraph package "OSSA Restructured Space Station Freedom Draft Payload Traffic Model D91-2C", which provides budget guidance for OSSA's Life Science, Microgravity Science and Applications, and Flight Systems Division.

Lori L. Paul

Randy Cassingham reports that work on the rewrite of "Introduction to Utilizing Space Station Freedom" for Code MU is progressing on schedule.

Upcoming Meetings

May 22-23: Task review for *Introduction to Utilizing Space Station Freedom* document task at NASA HQ. Randy Cassingham to attend.

July 8-11: International Conference on Environmental Systems in San Francisco. Dennis Kern and Gloria Badilla will present.

August 6-7: SUM/Director's Review in Oxnard, CA. H. Fitzhugh and C. Ivie to attend.

August 6-8: Second Evolution Symposium: "Beyond the Baseline '91" at the South Shore Harbour in League City. Paul Henry and Jeff H. Smith to attend.

Recent Space Station-related items from Code P's "Daily News in Brief" (Typos *not* corrected...)

No pertinent items to report.

EFC STARTIME, INC. is a Los Angeles based company which provides satellite time and network coordination to the communications industry.

A specialist in space segment, **EFC STARTIME** has both industry and private sources for satellite time. This results in a uniquely large offering of transponders to our clients.

EFC STARTIME is headed by Grace E. Leone. Ms. Leone has been in the communications industry since 1979. She served as Vice-President of Strategic Planning for American Communications Industries before founding **EFC STARTIME** in 1983.

EFC STARTIME can provide time on the following satellites:

Ku-Band time

SBS-3, 4, 5, 6

Spacenet 1, 2, 3

G-Star I, II, III, IV

C-Band time

Satcom C-1, 2R, F4

Westar 4, 5

Galaxy I, II, III, VI

Spacenet 1, 2, 3

Telstar 301, 302, 303

EFC STARTIME

Space Segment Pricing

(213) 823-6447

FAX (213) 823-0637

KU-BAND

	Prime	Non-Prime
SBS-4	\$365	\$365
SBS-5, 6	\$475	\$235
GSTAR 1, 4	\$485	\$260
GSTAR 2	\$495	- -
SPACENET 1, 2, 3	\$485	\$260
SATCOM K-1 (Full)	\$550	- -
SATCOM K-2 (Half)	\$325-\$450	- -
(Full)	\$550-\$785	- -

For KU-BAND, Prime-Time/Non Prime-Time varies with each satellite system. Please contact **EFC STARTIME** for more information.

C-BAND

	Prime	Non-Prime
WESTAR 4, 5	\$320-\$355	\$215-\$225
SPACENET 1, 2, 3	\$325-\$375	\$215-\$225
TELSTAR 301, 302, 303	\$320-\$355	\$215-\$225
GALAXY 2, 6	\$320-\$355	\$215-\$225
SATCOM C-1, 2-R	\$325	\$265

For C-BAND:

ALL TIMES EASTERN

MON.-FRI.

SAT., SUN., & HOLIDAYS

Prime-Time: 1600-0200

Prime-Time: 1200-0200

Non-Prime-Time: 0200-1600

Non-Prime-Time: 0200-1200

PRICES SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

Domestic Ku-Band Satellites

Channel To Frequency To Transponder Conversion

Anik C1, C2 & C3 Transponder	Uplink Frequency in Mhz	Downlink Frequency in Mhz
T1 (V)	14017	11717
T2 (V)	14043	11743
T3 (V)	14078	11778
T4 (V)	14104	11804
T5 (V)	14139	11839
T6 (V)	14165	11865
T7 (V)	14200	11900
T8 (V)	14226	11926
T9 (V)	14261	11961
T10 (V)	14287	11987
T11 (V)	14322	12022
T12 (V)	14348	12048
T13 (V)	14383	12083
T14 (V)	14409	12109
T15 (V)	14444	12144
T16 (V)	14470	12170
T17 (H)	14030	11730
T18 (H)	14056	11756
T19 (H)	14091	11791
T20 (H)	14117	11817
T21 (H)	14152	11852
T22 (H)	14178	11878
T23 (H)	14213	11913
T24 (H)	14239	11939
T25 (H)	14274	11974
T26 (H)	14300	12000
T27 (H)	14335	12035
T28 (H)	14361	12061
T29 (H)	14396	12096
T30 (H)	14422	12122
T31 (H)	14457	12157
T32 (H)	14483	12183

GStar 1, 2, 3 & 4 Transponder	Uplink Frequency in Mhz	Downlink Frequency in Mhz
1 (H)	14030	11730
2 (H)	14091	11791
3 (H)	14152	11852
4 (H)	14213	11913
5 (H)	14274	11974
6 (H)	14335	12035
7 (H)	14396	12096
8 (H)	14457	12157
9 (V)	14044	11744
10 (V)	14105	11805
11 (V)	14166	11866
12 (V)	14227	11927
13 (V)	14288	11988
14 (V)	14349	12049
15 (V)	14410	12110
16 (V)	14471	12171

Spacenet 1, 2 & 3 ASC 1 Transponder	Uplink Frequency in Mhz	Downlink Frequency in Mhz
19 (H)	14040	11740
20 (H)	14120	11820
21 (H)	14200	11900
22 (H)	14280	11980
23 (H)	14360	12060
24 (H)	14440	12140

Morelos 1 & 2 Transponder	Uplink Frequency in Mhz	Downlink Frequency in Mhz
1K (H)	14064	11764
2K (H)	14188	11888
3K (H)	14312	12012
4K (H)	14436	12136

GE K1 & K2 Transponder	Uplink Frequency in Mhz	Downlink Frequency in Mhz
1 (H)	14029.0	11729.0
2 (V)	14058.5	11758.5
3 (H)	14088.0	11788.0
4 (V)	14117.5	11817.5
5 (H)	14147.0	11847.0
6 (V)	14176.5	11876.5
7 (H)	14206.0	11906.0
8 (V)	14235.5	11935.5
9 (H)	14265.0	11965.0
10 (V)	14294.5	11994.5
11 (H)	14324.0	12024.0
12 (V)	14353.5	12053.5
13 (H)	14383.0	12083.0
14 (V)	14412.5	12112.5
15 (H)	14442.0	12142.0
16 (V)	14471.5	12171.5

SBS 1, 2, 3, 4 & 5 Transponder	Uplink Frequency in Mhz	Downlink Frequency in Mhz
1 (H)	14025	11725
*1 (H)	14030	11730
2 (H)	14074	11774
**2 (H)	14080	11780
3 (H)	14123	11823
4 (H)	14172	11872
5 (H)	14221	11921
6 (H)	14270	11970
7 (H)	14319	12019
8 (H)	14368	12068
9 (H)	14417	12117
10 (H)	14466	12166
***11 (V)	14048	11748
***12 (V)	14196	11896
***13 (V)	14294	11994
***14 (V)	14395	12095

SBS 6 Transponder	Uplink Frequency in Mhz	Downlink Frequency in Mhz
1 (H)	14025.0	11725.0
2 (V)	14049.5	11749.5
3 (H)	14074.0	11774.0
4 (V)	14098.5	11798.5
5 (H)	14123.0	11823.0
6 (V)	14147.5	11847.5
7 (H)	14172.0	11872.0
8 (V)	14196.5	11896.5
9 (H)	14221.0	11921.0
10 (V)	14245.5	11945.5
11 (H)	14270.0	11970.0
12 (V)	14294.5	11994.5
13 (H)	14319.0	12019.0
14 (V)	14343.5	12043.5
15 (H)	14368.0	12068.0
16 (V)	14392.5	12092.5
17 (H)	14417.0	12117.0
18 (V)	14441.5	12141.5
19 (H)	14466.0	12166.0

Downlink polarization
for each transponder
denoted in parenthesis.

* SBS 4 & 5 using uplink less than 1.5m.
** SBS 4 & 5 only.
*** SBS 5 single channel video only.

Domestic C-Band Satellites

Channel To Frequency To Transponder Conversion

Channel or Dial Number	Uplink Frequency in MHz	Downlink Frequency in MHz	Satcom 1R, 2R, 3R 4, 5 & C1	Telstar 301, 302 & 303 Comstar 4	Anik D1 & D2	Galaxy 1, 2 & 3 and Westar 4 & 5	Spacenet 1, 2 & 3	ASC 1	Morelos 1 & 2	Channel or Dial Number
1	5945	3720	1 (V)	1V (V)	1A (H)	1 (H)	1 (H)	1 (H)	1W/L (H)*	1
2	5965	3740	2 (H)	1H (H)	1B (V)	2 (V)	13L (V)*	7 (V)	1N (V)	2
3	5985	3760	3 (V)	2V (V)	2A (H)	3 (H)	2 (H)	2 (H)	1W/U (H)*	3
4	6005	3780	4 (H)	2H (H)	2B (V)	4 (V)	13U (V)*	8 (V)	2N (V)	4
5	6025	3800	5 (V)	3V (V)	3A (H)	5 (H)	3 (H)	3 (H)	2W/L (H)*	5
6	6045	3820	6 (H)	3H (H)	3B (V)	6 (V)	14L (V)*	9 (V)	3N (V)	6
7	6065	3840	7 (V)	4V (V)	4A (H)	7 (H)	4 (H)	4 (H)	2W/U (H)*	7
8	6085	3860	8 (H)	4H (H)	4B (V)	8 (V)	14U (V)*	10 (V)	4N (V)	8
9	6105	3880	9 (V)	5V (V)	5A (H)	9 (H)	5 (H)	5 (H)	3W/L (H)*	9
10	6125	3900	10 (H)	5H (H)	5B (V)	10 (V)	15L (V)*	11 (V)	5N (V)	10
11	6145	3920	11 (V)	6V (V)	6A (H)	11 (H)	6 (H)	6 (H)	3W/U (H)*	11
12	6165	3940	12 (H)	6H (H)	6B (V)	12 (V)	15U (V)*	12 (V)	6N (V)	12
13	6185	3960	13 (V)	7V (V)	7A (H)	13 (H)	7 (H)		4W/L (H)*	13
14	6205	3980	14 (H)	7H (H)	7B (V)	14 (V)	16L (V)*	13 (H)*	7N (V)	14
15	6225	4000	15 (V)	8V (V)	8A (H)	15 (H)	8 (H)	16 (V)*	4W/U (H)*	15
16	6245	4020	16 (H)	8H (H)	8B (V)	16 (V)	16U (V)*		8N (V)	16
17	6265	4040	17 (V)	9V (V)	9A (H)	17 (H)	9 (H)		5W/L (H)*	17
18	6285	4060	18 (H)	9H (H)	9B (V)	18 (V)	17L (V)*	14 (H)*	9N (V)	18
19	6305	4080	19 (V)	10V (V)	10A (H)	19 (H)	10 (H)	17 (V)*	5W/U (H)*	19
20	6325	4100	20 (H)	10H (H)	10B (V)	20 (V)	17U (V)*		10N (V)	20
21	6345	4120	21 (V)	11V (V)	11A (H)	21 (H)	11 (H)		6W/L (H)*	21
22	6365	4140	22 (H)	11H (H)	11B (V)	22 (V)	18L (V)*	15 (H)*	11N (V)	22
23	6385	4160	23 (V)	12V (V)	12A (H)	23 (H)	12 (H)	18 (V)*	6W/U (H)*	23
24	6405	4180	24 (H)	12H (H)	12B (V)	24 (V)	18U (V)*		12N (V)	24

* 72 Mhz band width transponders.

**OFFICE OF SPACE SCIENCE AND APPLICATIONS
RESTRUCTURED SPACE STATION FREEDOM
DRAFT PAYLOAD TRAFFIC MODEL D91-2C**

MAY 3, 1991

The purpose of this traffic model is to provide common guidance to OSSA's Life Sciences, Microgravity Science and Applications, and Flight Systems Divisions for the Summer 91-2 budget submission to OSSA. During the years 1996 through 1999, OSSA rack requirements approximate the OSSA allocation of 65 percent of U.S. payload accommodations.

This traffic model is being released with the 91-2 POP call. A final 91-2 Traffic Model will be released after the OSSA budget submission to the Administrator in the summer of 1991.

The Lab Support Equipment (LSE) phasing in the pressurized labs is provisional at this time, subject to review by the appropriate Requirements Integration Groups (RIGs) before release in the final 91-2 Traffic Model. The Laboratory Science Workbench has been dropped from OSSA's requirements. The Ultrapure Water System has been dropped from this Model, pending review of possible alternatives for satisfying OSSA's water quality requirements.



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Science and Applications

OSSA Space Station Payload Traffic Model D91-2C

Pressurized Volume Summary

Calendar Year →	1996	1997	1998	1999	2000	2001	2002	2003
	(Space Station Double Racks)							
SPACELAB TRANSITION PAYLOADS	5	1	{4}	{2}				
MICROGRAVITY SCIENCE			1		1 {1}			
ADVANCED PROTEIN CRYSTAL GROWTH FACILITY			2	1				
SPACE STATION FURNACE FACILITY				1				
MODULAR CONTAINERLESS PROCESSING FACILITY		1	1	1 {1}	2{1}			
COMBUSTION/FLUIDS FACILITY				1				
FUNDAMENTAL SCIENCE & SMALL RAPID RESPONSE				1 on FF				
BIOTECHNOLOGY FACILITY				UNDER REVIEW				
LIFE SCIENCES				Centrifuge				
CENTRIFUGE FACILITY			1	1				
HABITAT HOLDING FACILITY			1	1				
GRAVITATIONAL BIOLOGY FACILITY	2		1	2 {1}				
EVA/SPACE PHYSIOLOGY FACILITY/BMAC			1	{1}				
GAS-GRAIN SIMULATION FACILITY				2				
CELSS TEST FACILITY	1		3	1	2	3		
SUPPORT EQUIPMENT								
TOTAL	8	2	11 {4}	11 {5} +CF +1 FF	5 {2}	3		
TOTAL RACK TRANSPORT EACH YEAR	8	10	17	23 +CF +1 FF	26 +CF +1 FF	29 +CF +1 FF		
CUMULATIVE RACKS ON STATION	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
LOGISTICS / RESUPPLY				18				
OSSA ALLOCATION (65% of U.S. ALLOCATION)	10	10	20	+4 NODE				

NTC

PMC

{ } RACKS REMOVED.

NOTES:

- Centrifuge, Habitat Holding Facility (2 racks), Service Unit (1 rack), and LSE (1 rack) are contained in Node 3.
- Centrifuge to be integrated on the ground prior to launch.
- Life Sciences includes stowage in payload rack volume; Microgravity Science does not.
- Life Sciences Glovebox is required in 1998 to support Gravitational Biology Experiments.
- SRR payloads will be replaced at drawer level at TBD frequency after the SRR rack is on orbit.
- Unable to estimate logistics/resupply at this time.

Reviewed

R. Tyson
B. Tyson

Approved

E. Reeves
E. Reeves

Date

3 May 1991



OSSA
Office of Space
Science and Applications

OSSA Space Station Payload Traffic Model D91-2C
Spacelab Transition Payloads

Calendar Year →	1996	1997	1998	1999	2000
Advanced Protein Crystal Growth					
Directional Solidification Research					
Combustion Research					
Space Acceleration Measurement System/Small Rapid Response					
Total Transport	5	1	[4]	[2]	
Cumulative Racks On Station	5	6	2	0	

NOTES: • Combustion Research Comb-1 is supported by the Combustion/Fluids Facility C1 Microgravity Science Space Station Payload.

KEY	
[] RACKS REMOVED	
	1 Space Station Double Rack
	1 Space Station Double Rack Removed

CGF Crystal Growth Furnace
MPE Mission Peculiar Equipment

Reviewed M. Kicza
Approved E. Reeves
Date 3 May 1991



OSSA
Office of Space
Science and Applications

OSSA Space Station Payload Traffic Model D91-2C
Microgravity Science and Applications Pressurized Volume Payloads

Calendar Year →	1996	1997	1998	1999	2000	2001	2002
Advanced Protein Crystal Growth Facility			C1		C1 C2	UNDER REVIEW	
Space Station Furnace Facility			C1 M1	M2			
Modular Containerless Processing Facility							
Combustion/Fluids Facility		C1	Fluid-1	Fluid-1 Fluid-2	C1 C2 Comb-2		
Fundamental Science (FS) and Small Rapid Response (SRR)				SRR 1 FS On Free-Flyer			
Biotechnology Facility	UNDER REVIEW						
Total Transport		1	4	4 [1] +1 FF	3[2]		
Cumulative Racks On Station		1	5	8 +1 FF	9 +1 FF		

KEY

[] RACKS REMOVED



1 Space Station
Double Rack



1 Space Station
Double Rack
Removed

NOTES:

- Combustion/Fluids Facility C1 will support Spacelab Transition Payload Combustion Research Comb-1.
- ** SRR payloads will be replaced at drawer level at TBD frequency after SRR rack is on orbit.

Reviewed

M. Liska

Approved

M. Kicza

E. Reeves

Date



3 May 1991



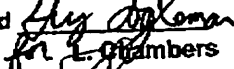

OSSA
Office of Space
Science and Applications

OSSA Space Station Payload Traffic Model D91-2C
Life Sciences Pressurized Volume Payloads

Calendar Year →	1996	1997	1998	1999	2000	2001	2002	2003
Centrifuge Facility Centrifuge (CF)				2.5 m CF		UNDER REVIEW		
Habitat Holding Facility			R1	R2				
Gravitational Biology Facility			R1	R2				
EVA/Space Physiology Facility/BMAC	EVA R1 R2		R3	SPBMAC R1 R4 R5				
Gas-Grain Simulation Facility			R1	R1				
CELSS Test Facility				R1 R2				
Total Transport	2		4	6 [2] +CF				
Cumulative Racks On Station	2	2	6	10 + CF	10 + CF			

KEY	
[] RACKS REMOVED	
 1 Space Station Double Rack	 1 Space Station Double Rack Removed

- NOTES:
1. Experiment stowage is included in payload rack volume.
 2. 2.5 meter Centrifuge integrated into Node 3 on the ground prior to launch.
 3. Node 3 contains the Centrifuge, Habitat Holding Facility (2 racks), Service Unit, and one rack of LSE.
 4. Life Sciences Glovebox is required in 1998 to support Gravitational Biology experiments.

Reviewed 
for E. Chambers
Approved 
E. Reeves
Date 3 May 1991

Space Station Utilization Team Weekly Meeting Minutes
For additions or changes to this list, contact Randy Cassingham

Distribution	Sec	Mall Stop	Phone	NASAmail	TELEmail
Aster, Bob	311	601-237	4-1369	RAster	
Badilla, Gloria	521	301-456	249-5252		
Beck, Hank	120	Reston ✓	8-457-7648	Hank.Beck	
Bergstrom, Sheryl	374	JPL-Cape ✓	8-253-2161		
Borden, Chet	311	601-237	4-1238		CBorden
Brown, David	331	Code MU	8-453-1179	DHBrown	
Cassingham, Randy	311	601-237	4-1273	RCassingham	
Coffin, Dick	317	301-280 ✓	4-3730	RCoffin	
Cutts, Jim	800	180-604	4-4120		
Deshpande, Govind	311	601-237	4-1279	GDeshpande	
Devirian, Mike	120	Reston	8-457-7209	MDevirian	
Doane, Jim	311	601-237	4-7996	JDoane	
Easter, Bob	120	Reston	8-457-7211	REaster	
Elachi, Charles	700	180-704	4-5673	CElachi	CElachi
Fitzhugh, H.L.	374	179-206	4-6906	HFitzhugh	HFitzhugh
Frederick, Suzanne	311	171-258 ✓	4-1181	SKFrederick	
Friesema, Stuart	HQ	Code MU	8-453-1184		
Gabriel, Steve	521	301-460	4-4952		
Garrett, Hank	521	301-456	4-2644		
Glavich, Tom	385	169-314 ✓	4-3952	TGlavich	
Glazer, Stu	HQ	Code SN	8-???-????		
Goranson, George	521	122-113	4-2809		
Gray, Bill	312	301-170U ✓	4-1090	BillGray	
Grumm, Richard	355	233-200	4-9267	RGrumm	
Handley, Tom	366	301-440 ✓	4-7009	THandley	THandley
Hansen, Bert	347	198-219 ✓	4-6092	BHansen	BHansen
Hartsough, Chris	367	301-350 ✓	4-1498	CHartsough	
Hendrickson, James	354	157-410	4-3458		
Henry, Paul	382	11-116	4-3106	PHenry	PHenry
Hixon, Dave	120	Reston	8-457-7220	DHixon	
Hooke, Adrian	317	301-235 ✓	4-3063	AHooke	
Horttor, Richard	339	161-228 ✓	4-2462	RHorttor	
Houseman, John	385	125-112	4-1601		
Hyde, James	120	Reston	8-457-7204	JHyde	
Ivie, Chuck	311	601-237	4-6045	CIvie	
Kehoe, Tom	120	Reston	8-457-7206	TKehoe	
Kelley, Jim	861	180-602	4-7068		
Kern, Dennis	521	301-456	4-3158		
Kleine, Henry	363	510-264 ✓	7-9690	HKleine	
Kossmann, William	120	Reston	8-457-7207		
Krauthamer, Stanley	342	303-300	4-7740		
Kuberry, Dick	521	301-460	4-8827		
LaBaw, Clayton	382	11-116	4-6248	CLaBaw	
Laeser, Dick	120	Reston	8-457-7200	RLaeser	
Laskin, Bob	343	198-326	4-5086	RALaskin	
Lattu, Kristan	374	179-206 ✓	4-2499	KLattu	
Lemmerman, Loren	790	233-200	?-????		
Lewis, Donald W.	797	183-801	4-0840		
Mahoney, Bill	328	169-327	4-6606	WAMahoney	
Martin, Benn	780	264-648 ✓	4-8263	Benn	NSCAT
Masline, Richard	366	301-440 ✓	4-4889	RMasline	
Mattingly, Richard	313	233-302 ✓	4-4605	RMattingly	
Maund, Don	311	2158 LaJolla Dr,	Stockton, CA 95204	MHumfreville	
Merrill, Orin	120	Reston	8-457-7223		
Millard, Jerry	354	89-1	4-2898		
Muirhead, Brian	352	158-224	4-8179	BMuirhead	
Murphy, Gerald	521	301-460	4-9598		
Nishioka, Ken	381	168-227 ✓	4-7674		
Oleson, Gary	120	Reston	8-457-7590		
Paul, Lori	311	601-237	4-1166	LPaul	

	Sec	Mail Stop	Phone	NASAmail	TELEmail
Pomphrey, Rick	366	100-22 ✓	584-2964	RPomphrey	
Pravdo, Steve	381	168-222 ✓	4-3131	SPravdo	
Rayman, Marc	312	301-170K ✓	4-2544	MRayman	
Reiz, Julie	640	512-110	7-7664		
Rosenberg, Leigh	311	601-237	4-1251	LRosenberg	
Schober, Wayne	881	180-603	4-8581	WSchober	
Shao, Mike	385	169-214	4-7834		
Shishko, Bob	311	601-237	4-1282		
Simmons, Larry	790	233-208 ✓	4-6336	LSimmons	
Smith, Jeff H.	311	601-237	4-1236	JHSmith	JHSmith
Smith, Jeff L.	311	601-237	4-1064	JLSmith	
Stachle, Rob	311	601-237	4-1176	RStachle	
Steele, Laura	311	601-237	4-1284	LCrary	
Starsman, Ray	120	Reston	8-457-7226	RStarsman	
Tai, Wallace	317	301-235	4-7561		
Taylor, William	HQ	Code M-8 ✓	8-453-2961	WWTaylor	
Tsou, Peter	???	183-501	4-8094		
Urban, Mike	120	Reston ✓	8-457-7591	MUrban	
Varsi, Giulio	880	180-603	4-2992	Varsi	
Volkmer, Kent	311	171-258 ✓	4-1240	Volkmer	
Von Gronefeld, Peter	120	Reston	8-457-7649	PVonGronefeld	
Vuolo, Bob	120	Reston	8-457-7587	RVuolo	
Wada, Ben	354	157-507	4-3600		
Webb, Allan	120	Reston ✓	8-457-7589	AWebb	
White, Robert H.	784	233-200	4-6786	RHWhite	
Wernitz, David	311	601-237	4-1270		
Wiener, Paul	310	301-230 ✓	4-5748		
Wright, Frank	740	180-335	4-5690	FWright	FWright
Zygielbaum, Art	750	180-701	4-3564	AZygielbaum	

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Total: 89 (62 paper, 27 NASAmail) * Printed 15 May 1991

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3 June 1991

TO: Distribution

FROM: Lori L. Paul

SUBJECT: Space Station Team Meeting Minutes for 3 June 1991

PRESENT: Rob Staehle, Bob Aster, Gloria Badilla, Barbara Brown, Randy Cassingham, Chuck Ivie, Henry Kleine, Don Lewis, Lori L. Paul, Robert Shishko

Next Meeting: 17 June 1991 at 10:30 in 601-243

Rob Staehle

The House of Representatives' Appropriations Subcommittee has allotted zero funding for the Space Station *Freedom* Program next year. Conversely, the Senate Appropriations Subcommittee has voted nearly full funding for the Program. There was some concern that an immediate Stop Work Order might be issued so that FY91 funding might be used to cover closeout costs should the Station program be canceled. At this point in time, it appears that only August and September FY91 funds are at risk of being withheld to pay for a possible shutdown of the Program. Some feel that the Space Station Freedom Program has only a 50/50 chance of surviving into FY92. See the attached "Daily News in Brief" excerpts for more detail. *[Note added 7 June: Overturning its committee vote, the house voted to maintain funding for the Station on June 6.]*

Technical work has slowed in Reston as JSO moves closer to its dissolution. Most functions are being transferred to other Level II organizations, and 16 JSO employees have accepted detailee positions with Space Station.

Dennis Kern/521 and John Garba/354 will be co-hosting the Spacecraft Dynamic Environment Technical Interchange Meeting (TIM), being held at the Aerospace Corporation (2350 East El Segundo Blvd., El Segundo) on 18-20 June. Call (213) 336-7203 for additional information or to pre-register for the meeting. Gloria Badilla/521 and Thomas Bergen/521 will present their study, "Predicting Microgravity and Acoustic Levels on Space Station Using VAPEPS." Their talk should interest all VAPEPS users, not just those involved with Space Station applications.

MSU has funded JPL Division 52 to be their key representative in the implementation of the Environment Definition and Assessment Program (EDAP). Sections 521 and 522 will pool their expertise to work on the program. Section 343's Disturbance Simulation Management Tool (DSMT) will be incorporated into the task.

Neil Divine/521 supported the "Update of Meteoroid and Orbital Debris Environment Definition" change request. His generally favorable evaluation of the CR was sent to B. Jeffrey Anderson at MSFC, with some suggested modifications.

An Evolution Working Group progress report for the Advanced Studies task is due today. Barry Meredith/LaRC will be studying at MIT for a year.

NASA is holding the first Long Duration Exposure Facility (LDEF) Post-Retrieval Symposium in Kissimmee, Florida 2-8 June. Over 125 papers are being presented on topics such as ionizing radiation, meteoroids and orbital debris, and space environmental effects on materials and systems.

Code MT personnel have been assigned new phone numbers:

	202/453	Room	NASAMail
Ahlf, Peter	x1896	325P	PAHLF
Barquintero, Kevin	x1185	540	KBARQUINERO
Bobek, Bob	x8614	536-N	RBOBEK (ALL-IN-ONE)
Cook, Steve	x1894	325-K	SGCOOK
Drews, Michael	x1888	325-M	MDREWS
Edwards, Andy	x1175	536-L	ANDEEDWARDS
Fernquist, Alan	x8201	325-L	AFERNQUIST
Gawdiak, Yuri	x8593	331	YGAWDIAK
Gearing, Adam	x1757	536-B	AGEARING
Gersh, Mark	x1895	325-N	MGERSH (ALL-IN-ONE)
Hockaday, Gina (Day)	x2373	325	
Huckins, Earle	x8712	536-P	EHUCKINS
Marshall, Ron	x1884	536-A	RMARSHALL
McLallin, Kerry	x2783	536-R	
Neumann, Paul	x1911	325-Q	PNEUMANN
Swietek, Gregg	x2864	536-M	GESWIETEK
Truman, Kathy	x8712	536	

Code MT Fax: 202/426-6111

Randy Cassingham

Current uncertainties in Space Station funding resulted in the cancellation of Randy's planned trip to Washington for review of the *Introduction to Utilizing Space Station Freedom* document. Randy's contact at MU, Jack Collier, a JPL detailee, hits the end of his "detaileeship" this week; he is being replaced by a NASA employee, Stacy Edgerton.

Chuck Ivie

Chuck is nearing completion of a white paper that investigates a supplemental communications system for the Station that utilizes existing communications satellite networks (see previous meeting minutes). He has been asked to present his concept at the Code MSU Payload Integration Management Meeting, User Operations Integration splinter session, on June 12, and do discuss it further June 14 in Hampton, VA.

Bob Aster

A Communications Analysis Team (CAT) case study is nearing completion. The rough draft for "Analysis of End-To-End Information System Latency for Space Station Freedom, Case Study 4" is under review. JSC provided Space Station Control Center (SSCC) latency values for the study. SSCC latency values were less than earlier feared.

Henry Kleine

Henry is working on a new FROST application for the Deep Space Network (DSN) architecture study.

Robert Shishko

Bob attended the Evolution Working Group's Configuration/Operations Working Session at LaRC May 14-15. Several viewgraph packages from the workshop were of interest: "Space Operations Database and Analysis System (SODAS) Methodology" by Ray A. Reaux/CTA Incorporated; "On-Orbit Assembly/Servicing Task Definition Study" by Fred Mitchell/LaRC and Rick Vargo/LaRC; "Advanced Automation for In-Space Vehicle Processing" by M. Sklar/McDonnell Douglas Space Systems Company and Tom Davis/KSC; "Crew Operations and Robotics Analysis" by Kevin

Lewis/JSC and Roy Decker/McDonnell Douglas Space Systems Company. Copies of these and other material are available from Bob.

Bob agreed to prepare a list of MESSOC (Method for Estimating Space Station Operations Costs)-related tasks which would be required to be updated to be applicable to the reconfigured Station.

Bob provided training in the use of SDTM and MESSOC to Bob Berkowitz, Lockheed/LaRC.

Gloria Badilla

Gloria and others are continuing vibroacoustic analysis on the Space Station habitation module. Rob is distributing copies of her recent paper to interested parties at OSSA, Levels I and II, JSC and MSFC, as well as within JPL.

Don Lewis

Don and Hershal Fitzhugh/374 will be attending the Payload Integration Management Meeting (PIMM), formerly the User Integration Panel (UIP), at LaRC on 12-14 June. The effects of the restructured Space Station on operations and integration issues will be discussed.

Don, Barbara Brown and Chuck Ivie discussed some of the possible value of Chuck's commercial satellite video and data downlink scheme for the Microgravity Containerless Processing Facility and experiments which might use it. Don noted a desire for two video downlink channels, of which the restructured Station appears able to provide only one without augmentation. The added capability which Chuck envisions was favorably received.

Don and Barbara discussed concerns about the recently revised NASA NMI 8010.1A, which appears to dictate that facilities (e.g., MCPF) be rated Class B. This forces the use of older technology and higher cost. Both felt a Class C facility might be more favorable, given the opportunity for replacement in the event of failure.

Upcoming Meetings

June 12-14: Payload Integration Management Meeting (PIMM), (formerly the User Integration Panel (UIP)), at LaRC. Don Lewis, Chuck Ivie and Hershal Fitzhugh to attend.

July 15-18: International Conference on Environmental Systems in San Francisco. Tom Bergen and Gloria Badilla will present.

August 6-7: SUM/Director's Review in Oxnard, CA. Rob Staehle, Bob White, Hershal Fitzhugh and Chuck Ivie to attend.

August 6-8: Second Evolution Symposium: "Beyond the Baseline '91" at the South Shore Harbour in League City. Paul Henry and Jeff H. Smith to attend.

Recent Space Station-related Items from Code P's "Daily News in Brief" (Typos *not* corrected...)

Washington Post -- 5/16/91

"HOUSE PANELS VOTE TO KILL SPACE STATION" By Tom Kenworthy and Curt Suplee

"A House subcommittee yesterday voted to terminate funding for the manned space station project, dealing a grievous blow to one of the Bush administration's key priorities in the space program."

The Post reports that the Appropriations subcommittee with jurisdiction over veterans' affairs, housing programs and various independent federal agencies voted, by 6 to 3, to cut all but \$100 million of the projected \$2 billion space station budget. The Post reports that the remaining \$100 million would be used to shut down the operations.

The article says that even proponents of NASA's space station project concede that the subcommittee action represents a major setback that will be difficult to overcome when the spending measure comes to the floor in June.

The report quotes Rep. Bob Traxler (D-Mich) as saying "we simply can no longer afford huge new projects, with huge price tags, while trying to maintain services that the American people expect to be provided."

New York Times -- 5/16/91

"HOUSE PANELS VOTE TO KILL 1992 FUNDS FOR SPACE STATION" By David Rogerbyes

"House Appropriations subcommittees voted to kill fiscal 1992 funding for the space station and trim President Bush's request for the superconducting super collider almost 19%."

The Times says that the more than \$2 billion savings from the costly station would be redistributed to help finance increases elsewhere in space programs and the National Science Foundation, as well as an expanded \$6.6 billion budget for the Environmental Protection Agency.

The report says that NSF would receive an estimated \$2.7 billion, including \$1.96 billion for research activities or nearly 16% more than the current fiscal year ending Sept. 30. The article says that within the \$13.65 billion allocated to NASA, the subcommittee approved the administration's full request for the ambitious Earth Observing System and the AXAF X-ray telescope.

The story says that after spending \$4.85 billion in the station project, NASA is not about to give up without a fight and that the agency will take its case to the Senate. The story says that NASA, though, is in for a long and difficult fight since the subcommittee seems to have made a decision viewed by others in Congress as being reasonably meritorious and strategic.

San Jose Mercury -- 5/19/91 (editorial)

"AN ASTRONOMICAL RISK" -- ...\$30 BILLION VENTURE THAT LACK A SCIENTIFIC MANDATE

"We'd love to see a U.S. space project that: (a) Accomplishes high priority work, urgent enough to draw a solid scientific mandate, yet economical enough to be politically defensible; and (b) That also creates jobs for this area, pumping dollars into Silicon Valley's sputtering economy; and (c) That helps local defense contractors diversify into civilian projects.

"Unfortunately, NASA's proposed space station, while strong on (b) and (c), is floundering on requirement (a).

The Merc's editorial continues, detailing station down-sizing and their agreement with that move, and the Space Studies Board's criticism that the scaled back project no longer met research requirements. It also noted "a House subcommittee's" axing of the station, which if it holds, could jeopardize jobs at Lockheed Missile & Space Co. in Sunnyvale.

The paper said last summer, "The only thing certain to go into orbit is the price." The burden is on supporters to prove the station cost-effective at any price, concluded the Mercury.

Associated Press -- 5/21/91

By Harry F. Rosenthal

"If Congress kills the space station, the nation will suffer a five year to 10 year technological decline like the one it experienced when the Apollo moon program ended, the nation's top space flight official says."

NASA official William B. Lenoir said, "The next step needs to be taken and needs to be taken now or else we are going to admittedly be in a going-out-of-business posture."

The House Appropriations subcommittee last week cut without warning all but \$100 million from the \$2 billion space station request for next year, which if not reversed, will kill the program.

Said Lenoir to reporters Monday, "In many ways we've put all our eggs into one basket... We don't have any contingencies that say 'Well, if it's lost, here's what we'll do.'" It would take at least five years for NASA to get up to speed on a new endeavor, the wire service reported Lenoir as saying.

Speaking of losing human technical resources, he said, "We're looking at a crisis here if we let too many people get out. We did not adequately plan our post-Apollo period and it's taken us almost two decades to fully recover technologically from having gone blindly over that cliff," quotes AP.

NASA officials are contacting congressional members to save the orbital laboratory station and hoping the President will throw his weight into their efforts, according to the wire service.

Many scientists have been openly opposed to the station saying its scientific return will not be worth its cost. But, according to AP, Lenoir said, "Space science is important but it's not the reason we are building a space station...any more than we went to the moon for science. However, having gone to the moon, we got a hell of a lot of good science out of it."

Rosenthal's piece concludes with Lenoir's outline of the international effects of closing out the space station program.

The (Baltimore) Sun -- 5/21/91

"THE SPACE STATION IS BROUGHT DOWN TO EARTH" Opinion By Daniel S. Greenberg

"The decision of a congressional subcommittee to deny construction money for the space station is a bang on the head but not a stake through the heart of the biggest folly on Washington's roster of high tech extravaganzas. Nonetheless, it's a hopeful sign of rationality on Capitol Hill. And it's an indication that the new system of federal budgeting is fulfilling its goal -- to make clear that the pot of federal money is limited and excess here requires austerity there."

Greenberg goes on, drubbing Freedom a "monument to excess, even by the casual standards of NASA economics." He traces its decline from a "vast, multi-purpose research center and staging area for deeper forays into space" to little more than a celestial motel for a handful of astronauts.

The piece contrasts GAO cost definitions on space station versus NASA's.

Greenberg notes NASA's "fiscal misfortune" for having to share limited funding with politically fashionable VA, HUD, EPA and NSF programs, but warns that the space station is politically injured but far from terminated. He calls to memory such resurrected programs as B-1, and SDI, even though, he admits, "the space station folly is evident even to the technically illiterate."

New York Times -- 5/28/91

"JAPAN TIES JOINT PROJECTS TO SPACE STATION PLANS" By David Sanger

"The Japanese Government, angered that its participation in the proposed space station is threatened by Congressional budget cuts, has issued an unusually blunt and direct warning that it might refuse to contribute billions of dollars to American-led 'big science' projects in coming years unless plans to build a vast outpost in space remain intact."

The Times reports, out of Tokyo, that this warning from the Japanese caps months of increasingly bitter exchanges between Japan and the U.S. over the repeated reduction of the space station's size and capabilities. The story says that the Japanese are building a critical \$2 billion laboratory module which is expected to be attached to the space station as part of its habitable volume. The report says the Japanese have already spent more than \$300 million on the project.

The story says that if the Japanese held true to their threat and refused to participate in other American-led projects, that the action could cripple a number of very expensive projects including the Superconducting Supercollider -- for which Japan is expected to contribute nearly \$1 billion.

The report says that the Japanese message comes less than two weeks after a powerful House subcommittee which oversees NASA voted to abandon the beleaguered space station.

The story says that the heart of Japan's complaint is that the U.S. is cutting back the space station without regard to its obligations under agreements the U.S. has signed with its foreign partners. The story concludes that the Japanese might be crucial financial partners in not only the space station project but several others as well, and for that reason alone might be able to cause the Administration to fight harder for space station funding.

Washington Post -- 5/25/91

"PANEL WOULD USE MOON TO BYPASS SPACE STATION" By Kathy Sawyer

"If the United States does not mind waiting another 20 years to begin preparing for a Mars mission, it could bypass NASA's proposed space station and conduct the same preparatory research with a lunar orbiter in conjunction with a moon base, according to a blue-ribbon administration panel."

The Post reports that a number of experts have said the main justification for the \$30 billion space station is to carry out research on human physiology in weightlessness and that the main purpose of the station would be to carry out that kind of research.

The Post reports that the station is threatened by Congress and that in terms of carrying out life sciences research, most groups prefer the work be done on a space station but also indicate that it could be carried out on a moon base.

The article reports that retired Air Force Gen. Thomas Stafford, head of a group tasked with coming up with appropriate future options for the NASA Administrator has proposed just such an alternative approach and quotes from an advance copy of the group's report which states "there is a compelling argument for the deployment of a first-generation Mars transfer vehicle in lunar orbit."

The story does quote Stafford directly, though, and says he responded by stating that "we come out very strongly in support of the space station. It is a critical part of life sciences research. When we talk about a Mars transfer vehicle, we're talking 20 years down the road."

Baltimore Sun -- 6/3/91

"NASA'S DREAM OF SPACE STATION MAY BE DEFERRED" By Craig Crawford

"NASA's dream of building a permanently staffed space station faces another rude awakening this week on Capitol Hill."

The Sun story says to blame it on the inevitable linkage of the space agency's recent failures, a stubborn recession and the federal government's debt -- but that these forces are being redressed this week as NASA's staunch supporters are heard by the House Appropriations Committee.

The story says that many NASA defenders are predicting they will lose both the committee and the House votes, but remain hopeful about their chances in the Senate this summer.

The Sun says that NASA's foibles and the votes this week are but skirmishes in a much bigger battle provoked by last fall's budget agreement between Congress and President Bush.

The story says that under the budget agreement plan, domestic programs now compete against each other for shrinking funds and that the Democrats favor bread-and-butter issues such as housing and aid for the sick and homeless while the Republicans favor strategic defense and scientific projects such as the SDI project and station.

The story also says the move to kill the station has set the stage for a wider-ranging debate on the role of space and the viability of NASA itself and quotes Sen. Jake Garn (R-Utah) as saying "this is beyond an attack just on the space station." The Sun also says that NASA's space flight chief, William Lenoir, said without the station the agency may go into a five or ten year hiatus.

The story concludes by noting that many congressional leaders are angry at recent NASA failures such as the Hubble mirror problem and the shuttle fuel system problems and see cutting the space station as a way to vent their feelings.

Washington Post -- 6/3/91

"ADMINISTRATION FIGHTS TO SAVE SPACE STATION" By Kathy Sawyer

"Richard H. Truly, the NASA administrator, was holding a regular 7:30 am staff meeting at NASA headquarters one recent day and the phone rang. It was President Bush, reporting in on the results of his assigned contacts with key members of the Senate."

The Post reports that this was just one example of how the president has thrown his weight behind the campaign to save the proposed Space Station Freedom and with it the future of the U.S. manned space program.

The story quotes Truly as saying "the President has been a willing participant. I couldn't get more support from the White House. It's been incredible."

The Post reports that a money-strapped House Appropriations subcommittee two weeks ago voted 6 to 3 to kill off the proposed \$30 billion space station and that action has triggered a major rescue effort by the administration which has linked the station to the nations' manned space program and to its international credibility as well.

The story says the administration has not written off the House, but says it believes the chances are brighter in the Senate. The article says the lobbying effort has been made more difficult by delays in the launch of the current shuttle mission.

The story concludes by noting that 20,000 jobs would be lost immediately if the station is really killed and another 100,000 would be lost through the ripple effect.

311.4-718

17 June 1991

TO: Distribution

FROM: Lori L. Paul ☉☉

SUBJECT: Space Station Team Meeting Minutes for 17 June 1991

PRESENT: Rob Staehle, Bob Aster, Randy Cassingham, Hershal Fitzhugh, Paul Henry, Chuck Ivie, Lori L. Paul

Next Meeting: 1 July 1991 at 10:30 in 601-243

Rob Staehle

The House of Representatives has voted to restore funding for the Space Station *Freedom* Program next year. Some of the funds allocated for the SSF Program will be conscripted from the budgets of NASA science projects.

The Stafford Commission released a draft of its Synthesis Report last week. The report concludes that the Space Station is essential for the continuation of life sciences research required for the Space Exploration Initiative (previously the Human Exploration Initiative). It also recommends against using SSF for the assembly of piloted lunar or Mars missions. The draft Synthesis Report is currently under review. With the guidance of Admiral Truly, NASA will prepare a preliminary implementation plan from recommendations made in the Synthesis Report. That draft plan will be sent to the National Space Council on 11 September. A final assessment and report will follow and be sent to Congress on 11 December of this year.

The Space Station evolution symposium, "Beyond the Baseline 1991" will be held at JSC 6-8 August 1991. Topics include: Critical scars, restructuring impacts, distributed systems growth, on-orbit vehicle processing and evolution operations, opportunities for commercial participation, advanced automation hardware and software development, telerobotic systems technology, the SSF information system, flight system automation, ground operations automation, commercial application of SSF technologies, and a review of related NASA technology, transportation, and exploration programs. It is not clear if JPL staff will be asked to present papers on last year's Code MT work at JPL. For additional information call Carla Armstrong at (713) 483-9071.

Rob noted the following interesting items from the minutes of the 24 April Evolution Working Group Distributed Systems review:

The impacts of restructure to the DMS reduced the number of Standard Data Processors (SDPs) from 14 (seven active, seven cold standby) to 4 (2 active, 2 cold standby) and the combination of application code into one SDP. The original architecture provided for 1 processor per application (provided large performance margins). As a consequence of the restructure, the offloading of software onto multiplexer-demultiplexers (MDMs) is now required.

Incremental upgrades of components [are] possible as bottlenecks are encountered in the system.

Additional slots in the growth SDPs and MDMs are available as well as additional memory (up to 4 MB) can be added. Subject to available power and volume in the modules, additional SDPs, Mass storage, and Multi Purpose Applications Consoles (MPACs) could be added via Fiber Distributed Data Interface (FDDI).

A 100Mbps FDDI is well suited to a 50 Mbps downlink.

The downlink capacity and scheduling is a limiting factor for growth.

Bob Shishko attended a recent Evolution Working Group meeting and reported to Rob that both the 8 rack and 20 rack pressurized logistics modules are still part of the baseline Station. It is not clear whether the 8 rack module would be used for on-orbit storage or multiple trips back and forth to the Station.

The following JPL papers will be presented at the "International Conference on Environmental Systems" in San Diego on 15-18 July:

- "Human Life Support During Interplanetary Travel and Domicile, Part I: System Approach," by P. K. Seshan/353, Joseph Ferrall/353, and Naresh Rohatgi/353. (This paper was presented at the 19th Intersociety Conference on Environment Systems, San Diego, CA 24-26 July 1989. It will not be presented at the upcoming conference, but has been included here because it is part one of a series of three papers that will be given at the conference. Those three papers are listed below.)
- "Human Life Support During Interplanetary Travel and Domicile, Part II: Generic Modular Flow Schematic Modeling," by P. K. Seshan/353, Joseph Ferrall/353, and Naresh Rohatgi/353.
- "Human Life Support During Interplanetary Travel and Domicile, Part III: Mars Expedition System Trade Study," by P. K. Seshan/353, Joseph Ferrall/353, and Naresh Rohatgi/353.
- "Human Life Support During Interplanetary Travel and Domicile, Part IV: Mars Expedition Technology Trade Study," by P. K. Seshan/353, Joseph Ferrall/353, and Naresh Rohatgi/353.
- "Hardware Scaleup Procedures for P/C Life Support Systems," by Naresh Rohatgi/353, Mark Ballin/ARC, P. K. Seshan/353, Vincent J. Bilardo/ARC, and Joseph Ferrall/353.

Call Lori L. Paul at x4-1166 to obtain copies of these papers.

The fifth annual "Space Operations Applications, and Research Symposium (SOAR 91)" will be held in Houston (at various sites near JSC) on 9-11 July 1991. Topics include intelligent systems, life science and human factors, automation and robotics, and environment issues. For further information, contact the Software Engineering Professional Education Center, University of Houston at Clear Lake, (713) 282-2223.

Tim O'Donnell/355 has proposed to Code Q a study that would define and develop methodologies for on-orbit non-destructive evaluation (NDE) of SSF. Code Q is seeking ways to assess the degradation of various systems on the orbiting Space Station over its projected 30 year life span. Accurate measurements of oxygen erosion, micro-meteoroid and orbital debris particle erosion, etc. on the Station will be necessary.

Guidelines for proposals to the Director's Discretionary Fund for FY92 were distributed at the end of May. Proposals are due to the Director's Office by 26 July. Contact the office of Moustafa T. Chahine at x4-6057 to obtain a copy of the guidelines memorandum.

Randy Cassingham

On 18 June, Randy will send the third annual "final draft" of the *Introduction to Utilizing Space Station Freedom* to Stacey Edginton/MUU for review and approval. (Stacey is Jack Collier's replacement.) Randy will continue to work on graphics and tables for the publication while HQ is reviewing the text.

Paul Henry

Paul recently attended a two week infrared technology short course at the University of Michigan.

Code R and Code C have tentatively approved Paul's draft of two candidate NASA Management Instructions (NMI) for the Level II Utilization Office: one concerning user entry and the other concerning the roles and responsibilities of OSF/SSFP and the user-sponsoring organizations. Code S has sent favorable comments though their approval is still pending. Formal approval for the policies is the next step. Paul will probably travel to Washington to expedite the approval process.

Remer Prince used Paul's work in a recent presentation to John-David Bartoe/MU concerning future plans for Remer's branch.

It was mentioned that NASA organizations and other U.S. sponsors are permitted to sponsor international users of the Space Station. According to present planning, U.S. sponsors must operate at the NASA Associate Administrator level.

Chuck Ivie

Thus far, response to the concept of using existing commercial satellite networks as an economical, supplemental communications system for Space Station payload downlink was positive. It was suggested that the concept could be tested through a Shuttle experiment. Angie Johnson/MSU was instructed by Bob Clark/Level II Payload Accommodations Manager to investigate sources of funding for further evaluation of this idea. Interest in the concept has been widespread and includes queries from NAA centers and Level II personnel, the Canadian Space Agency, the European Space Agency, and the Japanese National Space Development Agency.

Utilization of commercial satellite networks might relieve some of the burden from the overcommitted TDRSS. TDRSS supports an extensive number of Ku-band NASA projects, and the number of projects expecting support will increase dramatically by the middle of the decade. Substantially less than full time, full rate TDRSS coverage may be available to SSF.

If funding could be obtained for the remainder of FY91, Chuck would prepare a detailed plan for evaluating the commercial satellite network concept. Such a plan would recommend that the following tests be conducted:

1. An Earth-to-Earth test of the commercial satellite network.
2. An Earth-to-aircraft test of the commercial satellite network, perhaps getting quick-look data from a NASA aircraft experiment back to investigators on the ground in "near real time."
3. A Space Shuttle test of the commercial satellite network utilizing a RUCSAK-type module as an external payload experiment.

Bob Aster

The last Communications Analysis Team (CAT) case study, "Analysis of End-to-End Information System Latency for Space Station Freedom, Case Study 4," will be completed this week.

A memo is in progress that will assess the implications of using X-Windows on SSF (see concerns expressed in the 13 May minutes).

Upon delivery of the above two items, and completion of a few wrap-up activities, CAT work will end and its FROST applications account numbers will be closed.

Hershal Fitzhugh

Fitz, Chuck Ivie/311, and Don Lewis/797 attended the Payload Integration Management Meeting (PIMM), formerly the User Integration Panel (UIP), at LaRC on 12-14 June. It had been over a year since the group last met. The effects of the restructured Space Station on payload operations

and payload integration were discussed at length. Fitz will submit a detailed trip report to Rob regarding the meeting.

The decision was made at the PIMM to leave power on for experiments in the Station while the astronauts are not in residence. There may not be a command or data link (Fitz was unsure); however, there should be power available for experiments in progress.

Leo Perez/MS has been assigned to coordinate safety plans for Level II.

Upcoming Meetings

July 15-18: International Conference on Environmental Systems in San Francisco. Tom Bergen and Gloria Badilla will present.

August 6-7: SUM/Director's Review in Oxnard, CA. Rob Staehle, Bob White, Hershal Fitzhugh and Chuck Ivie to attend.

August 6-8: Second Evolution Symposium: "Beyond the Baseline '91" at the South Shore Harbour in League City. Paul Henry (or alternate) and Jeff H. Smith to attend.

Recent Space Station-related items from Code P's "Daily News in Brief" (Typos *not* corrected...)

Wall Street Journal -- 6/4/91

"HOUSE COMMITTEE DENIES FUNDING FOR SPACE STATION" By David Rogers

"The House Appropriations Committee denied new funding for the space station despite a strongly worded warning that President Bush would veto the underlying \$80.9 billion bill if money isn't restored for the project."

The Journal says that Budget Director Richard Darman, in a letter to House Appropriations Committee leadership, indicated Bush would veto the bill unless the station funds were restored.

The paper quotes Darman as saying "if a program, which has been supported by a bipartisan national consensus for the last seven years, is now canceled, it would call into question our ability to execute any large, complex science and technology program. Other nations would rightly question or reliability as a partner in such ventures."

Washington Times -- 6/5/91

"SPACE STATION BOOSTERS FUMING"

"The Bush administration told Congress yesterday that scuttling the space station Freedom could have dire economic and diplomatic results and deprive the nation's youth of a major source of inspiration."

The Times reports that the White House message was amplified by space station partners Japan, Canada and the European Space Agency, whose officials warned lawmakers that U.S. abandonment of the multibillion dollar project would jeopardize future international scientific ventures.

The story says the administration even hinted that it was ready to retaliate against members of Congress behind the effort to kill the project, should they succeed.

The article says the full House will vote on the bill tomorrow and says station supporters will try to restore the project's funding.

USA Today -- 6/6/91

"HOUSE SHOWDOWN TODAY OVER FREEDOM FUNDING" By Richard Wolf

"The future of U.S. manned space exploration may hang in the balance today as the Bush administration lobbies hard for House restoration of funds to send the \$40 billion space station Freedom into orbit."

The story says that supporters of the space station are predicting a narrow victory for an amendment which would add \$1.9 billion to station funding -- the same \$1.9 billion which the House Appropriations Committee stripped from the station funding to pay for environmental, housing, other science and veterans projects.

The paper says the drive to save the station has been aided by NASA's lobbying effort and by key calls from President Bush to several undecided lawmakers and quotes Rep. Robert Walker (R-Pa.) as saying "there's a lot of muscle being used on this thing."

The article quotes Rep. Robert Traxler (D-Mich.), the principal sponsor of the spending bill which axes all but \$100 million in closeout money for the station, as saying "it's very difficult to defeat the president of the United States and the contractors that are aligned with him."

USA Today says the House Rules Committee paved the way for today's showdown by permitting lawmakers from Texas and California, states with the most at stake in the Freedom project, to offer an amendment which would restore the station's 1992 funds.

The paper says that in order to make the amendment attractive to other lawmakers, Reps. Jim Chapman (D-Texas), and Bill Lowery (R-Calif.) propose taking more than \$1.6 billion from other NASA accounts, freezing the agency's non-space station funding at 1991 levels. The story says an additional \$250 million would come from housing subsidies.

Wall Street Journal -- 6/10/91

"THE SPACE STATION - A \$30 BILLION BOONDOGGLE" By Robert Kekerka (An Opinion Piece)

"Thursday's vote in the House of Representatives to proceed with a \$30 billion manned space station, to be called Freedom, is being hailed as a triumph for America's space program."

The author, dean of the college of science at Carnegie-Mellon University, says it would be better to have no space station than the one Congress seems prepared to build.

Kekerka says this is not just his opinion, but also the opinion of the National Research Council's Space Science Board. The author says the station could be used for two different kinds of science, microgravity research and life science research but that neither of these sciences will be well served with the present design of the space station.

The author says the U.S. is in danger of spending \$30 billion to launch a station that cannot accomplish its principal task because no one in Washington has the courage to counteract the momentum the space station project has gained.

Kekerka says the proponents of the station often accuse the opponents of not seeing the usefulness of station or of being ticked off because the station will not have all the "bells and whistles" the scientists want. Kekerka says that is not true in his case, that he favors a station, but one which is right for the job: either a cheaper and smaller unmanned model for some of the microgravity experiments or a larger, more sophisticated one for the life sciences research. In either case, Kekerka says that NASA should forget the rush to get something and hold out for the "right" something.

The author concludes by noting all this makes him wonder if the \$30 billion for the station might be better spent on the homeless he sees sleeping on the subway grates everytime he visits the National Academy of Sciences in Washington to give advice that nobody wants to hear anyhow.

Space News 6/10-16/91

"STATION WIN MAY BE COSTLY FOR U.S. PROGRAM" By Andrew Lawler

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"The June 6 vote reviving the space station in the House of Representatives sets a new trajectory for the civil space program in the United States that will have repercussions for Europe, Canada and Japan's space efforts as well."

Space News says the vote reaffirmed the U.S. commitment to its international space station partners but came as a blow to space scientists, who had mounted a heavy lobbying campaign to keep the station killed.

The story says the move by space scientists had angered Office of Management and Budget Director Richard Darman and that it was one of the reasons why the station funding was taken out of space science rather than other, non-NASA, programs such as housing.

The article says this may have served as a "hardball lesson in politics" to scientists and cites Space Studies Board chairman Lou Lanzerotti as saying "the amendment does not recognize the need for a balanced U.S. space program."

The article also quotes OMB associate director Robert Grady as countering "the science program will remain at 20 percent of NASA's budget."

New York Times - June 11, 1991

"SPACE ERRORS SHARE PATTERN: SKIPPED TESTS" By William Broad

"The rules of spacecraft construction may not be etched in stone like the Ten Commandments, but the penalties for ignoring them are generally swifter and more violent."

The Times reports that the dictums are based on decades of experience, are widely disseminated, and cover such things as how to establish clear lines of authority, how to turn blueprints into specifications for thousands of miniscule parts and how to test rigorously on the ground to uncover flaws and increase the odds once the items are in orbit. The story says this set of procedures go under the unassuming title of "system engineering."

The paper reports that aerospace experts have repeatedly and consciously broken these rules during the past decade throwing the American space program into a tailspin. The Times cites the Hubble Telescope mirror problem, flaws in the shuttle fleet and design defects in the planned space station as examples of this recent ignorance.

The story continues, stating that federal and private experts are now warning that things could get even worse for NASA unless basic reforms are made in its pursuit of big space projects -- in particular citing the need for ample enough budgets to obviate the need for corner cutting.

The story quotes NASA deputy J.R. Thompson as saying "we get caught up in our enthusiasm. Some of these spacecraft get overloaded with requirements, and then people have a hard time trying to carry them off. The paper says the agency recently set up an Engineering Council to review new projects and keep them from exceeding projected budgets.

The Times says a battle for space program funding recently broke out in the Congress over paying for the space station, and implies one of the victims of the station pursuit will be the Earth Observing System. The paper quotes former JPL director and current Calif. Inst. of Tech. professor Bruce Murray as saying "we're headed for real disasters. The plan is to sin now, pay later."

The Times says that budget woes may be but one of the NASA problems and says experts also cite an aging workforce, management insensitivities and shortcomings and even the increasing complexity of the projects themselves.

The article, lengthy and deep in areas such as background on the Hubble problems, says the quandary now facing Congress is how to finance a number of expensive NASA science projects for this decade as well as financing the space station. The article concludes by noting that aerospace experts, both private and institutional, say the problem facing NASA must be resolved expeditiously and with great care -- otherwise inadequate budgets and pernicious compromises could doom the American space program to a continuing series of failures.

Space Fax Daily -- 6/14/91

"VOLUNTEERS FOR SPACE STATION TOLD NOT TO DRINK THE WATER"

"Yesterday's scheduled taste test of water purified via a water recycling system at NASA Marshall Space Flight Center was cancelled last weekend when tests on a sample of recycled water showed a contamination content of 700 microbes per 100 milliliters."

Space Fax says the equipment was supposed to reduce the level of contaminants to less than one part in 100 milliliters. The newsletter says the equipment was to be re-sterilized and the tests will start again shortly.

Space Station Utilization Team Weekly Meeting Minutes
For additions or changes to this list, contact Randy Cassingham

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JET PROPULSION LABORATORY

INTEROFFICE MEMORANDUM

311.4-724

1 July 1991

TO: Distribution

FROM: Lori L. Paul

SUBJECT: Space Station Team Meeting Minutes for 1 July 1991

PRESENT: Rob Staehle, Bob Aster, Chuck Ivie, Lori L. Paul

Next Meeting: 15 July 1991 at 10:30 in 601-243

Rob Staehle

Henry Kleine will be shipping one Sun Workstation to Bob Vuolo/MSU so that the Freedom Operations and Simulation Test (FROST) and related work can continue at Code MSU.

Rob has assisted with the review of a change request affecting ESA Attached Payload Module (APM) interface requirements (CR BB003024). Rob noted some ambiguity in the requirements. For example, a mechanical interface requirement (item 4.13.1.2) states that, "The clearance of the node 1 hatch for access to the ESA APM shall be no less than 1270 x 1270mm (50 x 50 inches)." No existing standard hatch interface was specified. He also expressed concern regarding an EVA requirement, and pointed out that no EVA is required when Mir modules are joined. Rob's comments were provided to Bob Glass/JSO last week.

The Evolution Working Group (EWG) will be represented at a meeting today (1 July) and tomorrow at JSC to discuss the Space Station's response to the Stafford Commission Synthesis Report. There is some feeling that there was a lack of support for SSF (including little mention of benefits to be derived from the Space Station) in the report.

Preparations continue on the Space Station evolution symposium, "Beyond the Baseline 1991" that will be held at JSC 6-8 August. It is still not clear if JPL staff will present papers on last year's Code MT work at JPL. It has been announced that Admiral Truly will give the keynote address if Vice President Quayle is not available. Steve Cook/MT is collecting abstracts for the symposium.

Stan Fishkind/MU will meet with Chuck Ivie/311 at JPL this Wednesday afternoon (3 July) to discuss Chuck's concept to utilize commercial satellite networks as a supplemental communications system for SSF. Stan will also meet with Rob and Bob Aster. Rob told Stan he should send a formal request for detailees to Pete Lyman/100.

Bob Aster

Govind Deshpande has received a NASA "Tech Briefs" monetary award for his contribution to the Station Design and Tradeoff Model (SDTM). Other SDTM team members will be receiving the same award.

The last Communications Analysis Team (CAT) case study, "Analysis of End-to-End Information System Latency for Space Station Freedom, Case Study 4," has been completed. Distribution should begin this week.

Chuck Ivie

Response to the concept of using existing commercial satellite networks as an economical, supplemental communications system for Space Station payload downlink remains positive. There is real interest in performing some communications satellite network experiments on a NASA DC-8 aircraft. A principal investigator (PI) on the ground would perform telescience experiments on the aircraft.

There is also interest in performing microgravity experiments onboard F-104 or F-15 aircraft that would test microgravity equipment components and various data uplinks and downlinks. Testing the performance of components before actual use on the Space Station would be prudent. Experimentation may require the upgrade and recertification of the test aircraft.

Lori L. Paul

Consolidation of documents in the Space Station Library is continuing. The restructured Space Station has made quite a few documents obsolete. As a result, many documents have been discarded.

Upcoming Meetings

July 15-18: International Conference on Environmental Systems in San Francisco. Tom Bergen and Gloria Badilla will present.

August 6-7: SUM/Director's Review in Oxnard, CA. Rob Staehle, Bob White, Hershal Fitzhugh and Chuck Ivie to attend.

August 6-8: Second Evolution Symposium: "Beyond the Baseline '91" at the South Shore Harbour in League City. Paul Henry (or alternate) and Jeff H. Smith to attend.

Recent Space Station-related Items from Code P's "Daily News in Brief" (Typos *not* corrected...)

Washington Post -- 6/19/91

"SPACE BUDGET BATTLE: HUMANS 1, ROBOTS 0" By Kathy Sawyer

"The natural tension between those who favor human space flight and those who prefer to launch robots is almost as old as the space age, but it recently escalated from the level of a family feud into a knock-down , drag-out fight.

"The robots lost big."

The Post reports that the catalyst for this was the proposed space station Freedom, whose survival the White House and NASA have equated with the fate of the manned space program and for which the House of Representatives voted 240 to 173 in favor of manned space.

The story says that under a rescue amendment to the House funding bill, NASA's 1992 budget would remain at 1991 levels -- which would continue funding for the space station but which would deny funding for several robotic missions whose development is at a stage requiring an increase in funds.

The paper says the administration points out that the amendment was not a policy choice but rather the only tactic which would work to get needed House support for the station. The paper also says that NASA has not given up trying to secure funding for the other programs, and quotes NASA chief Richard Truly as saying the victory "was a political victory, not a budget victory."

The story says that administration and NASA officials, in particular, Office of Management and Budget director Richard Darman, were peeved by the attacks on the space station by space scientists and quotes Darman as saying the scientists were "politically naive" if they thought funding taken from the station would go to support their programs.

The Post quotes space policy analyst John Logsdon, director of the Space Policy Institute at the George Washington University, as saying "this was a stark choice between human exploration versus pure science. Congress has indicated where it stood. The space science community put it up for a vote and I trust they are reading the results."

Wall Street Journal -- 6/21/91

"DEBATE OVER SPACE POLICY MAY PRODUCE PROGRAM THAT DELAYS PLANS, WASTES FUNDS, PLEASE NO ONE" By Bob Davis

"The current fight over the future of U.S. space exploration may eventually yield a program that sets the nation firmly on the course of a permanent presence in space -- or a program that delays projects, wastes money and in the end satisfies no one."

The Journal says that at the heart of the controversy is NASA's plan to build the \$30 billion space station by the end of the decade and that the station is central to the administration's plan to use astronauts to explore the solar system. The Journal says this issue is the dividing line between what it calls "true believers" and space scientists.

The paper says the true believers dominate the debate and that, quoting Richard Darman -- the powerful White House budget director, what is required in space exploration is "a leap of faith." The Journal quotes Darman in an elaboration of that theme, "Almost by personality type, you want to press limits, press frontiers, or you don't."

The paper then counters saying that the majority of scientists say that manned expeditions are more folly than frontier and cites Eugene Levy of the University of Arizona as explaining that if one wanted to push the frontier of robotics and artificial intelligence one would send robots on a scouting mission to Mars. The paper quotes Levy as saying "these are the critical technologies in which Japan is eating our lunch."

The article says that scientists have been battling manned projects, without much luck, since the beginning of the Space Age and reminds readers that President Kennedy rejected the advice of his science advisor when he decided to land a man on the moon.

The paper says that in the Congress, during the vote for space station funding, representatives of states with NASA facilities and representatives who had never spoken out on the issue before came forth and spouted words the paper described as "romantic rhetoric" in support of their fervor to explore the solar system with humans. The Journal states that there seemed to be much more of a link with the romance than with the pork barrel in this Congressional support.

The Journal piece is reasonably balanced with citations from the anti and pro sides of the space station issue and ultimately gives Darman the last word as the article quotes from him that the political constituency for manned exploration will emerge from the development of the station and its impact terrestrially and that "people's earthly interests will grow and grow."

Time Magazine -- July 1, 1991

"THE \$40 BILLION CONTROVERSY."

(abstracts of a conversation between Jerome Cramer, Time, and Adm. Richard Truly, NASA, in a "interview" article)

"Q. Congress debated eight hours before approving the space station...why does the U.S. need it?"

"A. There are several answers, but essentially we need (it) to keep the leadership position the U.S. holds in space...It's a matter of both world leadership and economics."

"Q. But for \$30 billion or \$40 billion? Couldn't we keep this...position by ...something smaller, cheaper...?"

"A. Space station Freedom is an inevitable step in the march to space exploration...It is unthinkable that this nation, based on our history, science and technology...would turn its back on manned space efforts."

"Q. In these times of budget limitations, can we afford the luxury of a manned space station..."

"A. ...Freedom will pay dividends by providing new research in the areas of environmental control and life support research, power generation and health care technologies..."

"Q. Doesn't this sound a little like...trickle down..."

"A. This is not a Republican project...If NASA were cannibalized...you wouldn't have a space station...we also wouldn't have touched the pressing problems of schools, housing or cities in any significant way."

"Q. ...Couldn't this money be spent directly on science..."

"A. There's no guarantee that the money cut out of the space station would remain in NASA...Those who say that savings from reduced space exploration will go to increase direct science spending are politically naive..."

"Q. ...Are you convinced that this current plan is the best space station possible?"

"A. Space station Freedom will meet its objectives. It's time to get the sketches off the boards and build it..."

"Q. Some members of Congress hit you hard. One called it 'Space Station Lite -- one-third the mission for nearly four times the price.'..Your reaction?"

"A. Such charges are irresponsible...This program is at the very essence of our nation's economic vitality. It's not about jobs so much as it is vision, daring, exploring..."

"Q. To pay for the space station, the House...capped all other increases...Did your other scientists object?"

"A. Some did, but we are working with the Senate to get the funds restored."

"Q. What about NASA's program to build a hypersonic transport plane...Is this still on the mark?"

"A. ...Our job is to fund research and let the private companies...decide whether the plane should be build."

"Q. What about Mission to Planet Earth...Will Congress take aim at this expensive venture?"

"A. The program is poorly understood and promises unbelievable benefits..."

"Q. ...Do you miss being in space?"

"A. ...Until this recent work on the budget, I'd attended every launch since Challenger...I'd trade slots with any of them in a minute."

Associated Press -- 6/25/91

"COSMONAUTS WALK IN SPACE"

"Two Soviet cosmonauts spent nearly five hours outside the orbiting Mir space station today to repair a damaged antenna, the official Tass news agency reported."

AP, reporting from their Moscow bureau, says that cosmonauts Anatoly Artsebarsky and Sergei Krikalev replaced part of a broken antenna used in docking resupply ships and that they are scheduled to spend five months in orbit, doing repairs to the station among other things.

Space News -- 6/25/91 "Inside Space"

"THE LATEST ANSWER TO SPACE STATION"

"A group of frustrated space station engineers, calling themselves the Center for Strategic Space Studies of Reston, Va., have begun circulating a detailed concept paper recommending that NASA slow work on the estimated \$30 billion outpost in favor of refurbishing and launching the backup Skylab orbiting workshop, now gathering dust in the Smithsonian's National Air & Space Museum in Washington."

The weekly paper says the group has sent their concept paper to nearly every political space official in Washington and to a multitude of others including Boris Yeltsin.

The article says the group claims to be able to refurbish the workshop and launch it on the as-yet to-be-developed National Launch System for four billion dollars.

Space News -- 6/25/91

"HERMES BUILDERS CLAIM FURTHER COST CUTS NOT POSSIBLE" By Peter de Selding

"The manufacturers of Europe's future Hermes space plane said last week that they could not reduce the plane's cost much further from the \$8 billion figure proposed to the European Space Agency."

The paper's Paris correspondent quotes the Aerospatiale Hermes director Phillippe Couillard as saying "to place a man into space, you have to have money. We have reduced costs as much as we can. We can't do much more. Beyond that -- well, flying with only one wing would be difficult."

The story says that under a proposed presented to the 13 member ESA general council in march, Hermes would fly once a year beginning in 2000. The paper says that parts for a second Hermes would be ordered but that the plane would not be assembled for several years as a means of saving money.


The article says that ESA's governing ministers will meet in mid-November to review the Hermes proposals and those associated with the European Columbia space station segments, to which Hermes would fly.

JET PROPULSION LABORATORY**INTEROFFICE MEMORANDUM**

311.4-727

15 July 1991

TO: Distribution

FROM: Randy Cassingham 

SUBJECT: Space Station Team Meeting Minutes for 15 July 1991

PRESENT: Rob Staehle, Randy Cassingham, Paul Henry, Bob Aster, Chuck Ivie, Hershal Fitzhugh, Chuck Ivie

The Date of the Next Meeting will be Announced to Those on Distribution

Note: If you would like to be deleted from the weekly distribution of this memo, or need to change a mail stop or other item, please call Randy Cassingham at x4-0455 or send a NASAmail message to RCassingham. The distribution list is attached.

Rob Staehle

Rob spoke with Bob Easter about the latest political happenings. The Senate appropriations Committee that oversees NASA approved a \$14.3B budget for NASA next year, versus \$13.8B by the House. Of this, \$2.2B is earmarked for the Space Station (vs \$1.9B by the House). A few JPL projects may be hit, most notably the line item containing SIRTf, Gravity Probe B and the Orbiting Solar Lab, which took a \$66M hit. CRAF/Casini was hit \$112M; CRAF would be terminated and Casini delayed by a year. EOS would be reduced by \$50M. The full committee will meet today or Tuesday. The committee recommendations should go to the full Senate this week or next.

A number of Reston personnel have accepted new jobs or detailee positions, most starting today.

Stan Fishkind/MU plans to request a JPL detailee to serve as a Communications Engineer, starting in September. Anyone interested in the position should contact their Division. The NASA request will be sent to Pete Lyman/100 and circulated from there.

The Fifth International Symposium on Materials in a Space Environment will be held September 16-20 in Cannes Mandelieu, France. The registration deadline was June 30. Randy Cassingham has a copy of the program.

AIAA is hosting "Mars Exploration – Past, Present and Future" July 17-19 in Williamsburg, Virginia. Also, the 15th Anniversary Viking reunion will be held at LaRC on July 20. Contact Catharine Schauer at LaRC (804 864-3309) for details on the reunion.

Rob will be a member of the faculty at the International Space University in Toulouse, France, this summer. He will be back in early September. He will be "teaching" (i.e., coaching) the design project, an international piloted mission to Mars, to 130 students from 27 countries. Jim Burke/313 has also been helping out at ISU. Rob will be available by phone and fax in the meantime. Urgent messages can be left for Rob at the ISU Faculty Office (telephone 33-61-17-11-00). Fax messages may be sent to his attention at 33-61-17-11-39. You may also attempt to reach him via NASAmail (RStaehle), but this connection has not been verified. Mail may be sent to him in care of the International Space University, Fed Espace/ISU, BP 4109, 31030 Toulouse CEDEX, FRANCE.

Rob will be on vacation starting about August 24th.

Randy Cassingham

HQ has asked Randy to provide a new draft of the *Introduction to Utilizing Space Station Freedom* document, and then come to headquarters for a page-by-page review. He expects to deliver the new draft next week.

Paul Henry

The two draft user policies have been delivered to Headquarters to start the approval cycle to become NASA Management Instructions. Barry Epstein/MUU thanked Paul for his efforts in getting the job done on schedule despite having to have all sponsor codes review the drafts. Barry is interested in having us submit a plan to spend the remaining funds in the user policy account; Paul and Rob will have a telecon with Barry and Remer Prince/MUU on Thursday to discuss this.

Remer suggested adding policy wording on the user's *exit* from the Program to the user entry policy. Paul thinks it would be a mistake to do this; it would be too formal and difficult to change, and it would mean passing another draft through the sponsor codes.

Paul will be out of town from July 29 to August 15.

Bob Aster

The last FROST case study, *Analysis of End-to-End Information System Latency for Space Station Freedom*, has been distributed.

In response to some concerns raised by Stan Fishkind/MU, Bob will be submitting a proposal to evaluate the chosen windowing system for the Station's workstations, X-windows, and to suggest better alternatives, if any. There is a possibility that X-windows will not be suitable -- it was designed for Unix workstations, but the Station's workstations will be 80386-based systems not using Unix.

Hershal Fitzhugh

Fitz has been asked to review the recently released draft of the "Payload Integration Center (PIC) Qualification Requirements Document". It is a precursor document to a future implementation plan. The document shows a documentation structure for the plan, but the document itself is not shown anywhere in that structure.

Fitz, or Don Lewis as an alternate, will be attending a number of meetings in the next several months. See the "Upcoming Meetings" section for a list. Fitz especially recommends that people consider attending the telecon on July 23; they are "very educational".

Chuck Ivie

Chuck is working on designing an experiment for his Alternative Communication System for Space Station concept. He hopes to combine microgravity experiments with telescience experiments on a supersonic aircraft. JPL's astronaut Eugene Trinh finds the concept very interesting, and hopes to be involved in the experiments. An F-104, capable of flying for up to one minute in microgravity, is being negotiated for by Chuck from Ames/Dryden at Edwards Air Force Base. Future aircraft possibilities include the F-15e and the SR-71, whose greater mach envelopes may provide extended microgravity durations of up to 1.5 and 3 minutes, respectively. Technical issues regarding the operation of these aircraft for extended periods of microgravity need to be resolved.

Upcoming Meetings

- July 15-18: International Conference on Environmental Systems in San Francisco. Tom Bergen and Gloria Badilla will present.
- July 17: Payload Rack Technical Information Meeting at MSFC. Don Lewis to attend.
- July 22-26: Space Station Science and Applications Advisory Subcommittee (SSSAAS) meeting at Estes State Park, Colorado. Hershal Fitzhugh to attend.
- July 23: WP-02 videocon on restructuring (held in the building 230 video conference room) at 9:30 a.m. PDT.
- August 1: Data Management System videocon (held in the building 230 video conference room) at 8:00 a.m. PDT.
- August 6-8: SUM/Director's Review in Oxnard, CA. Rob Staehle, Bob White, Hershal Fitzhugh and Chuck Ivie to attend.
- August 6-8: Second Evolution Symposium: "Beyond the Baseline '91" at the South Shore Harbour in League City. Paul Henry's alternate and Jeff H. Smith to attend.
- August 27-29: Science Utilization Management Annual Review meeting at Headquarters. Hershal Fitzhugh to attend.
- September 17-19 (tentative): Space Station Program Review meeting at Headquarters. Rob Staehle, Bob White and Hershal Fitzhugh to attend.

Recent Space Station-related items from Code P's "Daily News In Brief" (Typos *not* corrected...)

Washington Post -- June 30, 1991

"U.S., SOVIETS RESUME DISCUSSIONS ON SPACE SWAP" By Kathy Sawyer

"The impending U.S.-Soviet summit has revived high level discussions of a swap in which American astronauts would fly for months aboard the Soviet space station Mir and cosmonauts would be launched on a U.S. space shuttle."

The Post quotes an administration official familiar with White House planning who said "there's been a lot of discussion but no decisions have been made."

The story says that in addition to the value of the exchange as a symbol of the cordial relations between the two countries, the exchange could have operational and scientific benefits for both space programs.

The Post says that the Americans could collect data on how humans adapt to weightless conditions if they were to fly aboard the Mir.

Washington Technology -- June 27, 1991

"NASA KNOCKS SYNTHESIS PANEL REPORT" By Gene Koprowski

"In not-for-attribution comments, NASA officials are claiming the Synthesis Group report on America's Space Exploration Initiative, released in recent weeks by former astronaut Gen. Thomas Stafford, offers no new suggestions and only rehashes several past NASA studies."

The weekly Washington-based technology paper says the tenor of negative remarks became so intense that Stafford last week released a printed rebuttal of the criticisms, pointing out the ways in which the studies differed.

The paper says that Stafford's detractors portray the report as just a shallow copy of three studies released in recent years by NASA -- the Paine Report, the Ride Report, and the NASA 90 day study.

The article says that the most telling difference between earlier recommendations and those of Stafford's group is that the latter have recommended that any Mars mission begin with testing equipment and operations on the surface of the Moon.

The paper says that government sources indicated one reason for the chilly NASA reception to Stafford's recommendations was the suggestion that the Energy Department and Defense Department be made equal partners -- a suggestion that would end NASA's monopoly on space. The story says that earlier the White House had delayed the release of the Stafford report because it was lukewarm toward the space station.

Huntsville Times -- 6/30/91

"MIKULSKI: 'YOU BET' SHE'LL LEAD SENATE FIGHT FOR STATION" By John Anderson

"U.S. Sen. Barbara Mikulski, chairman of a Senate committee that will help decide the fate of the embattled space station Freedom, came out in strong support of the program here Saturday night."

The paper quotes Mikulski as saying "I'm absolutely committed to saving the space station. Let me say loud, clear and unabashedly, I'm a supporter of the space station. And I intend to fight for full funding of the space station."

Washington Post -- 7/10/91

"COALITION OF SCIENTISTS DECRIES SPACE STATION" By Curt Supplee

"An extraordinary coalition including many of America's most illustrious scientific and mathematical societies yesterday made a last-ditch attempt to protest proposed spending for the Bush administration's program to build a space station."

The Post reports that a consortium of 14 professional groups warned that the excessive cost of the planned \$30 billion station would drain so much funding from the support of science that it would threaten the vitality of essential research programs and imperil U.S. leadership in world technology.

The Post says the coalition seems to be represented by the presidents of the American Physical Society, the American Chemical Society, the American Geophysical Union, the American Mathematical Society and Sigma Xi. The story says the presidents sent a jointly signed letter protesting the proposed station to all 100 Senators.

The paper says this is the first time since a similar coalition protested the start of President Reagan's Strategic Defense Initiative program that such a universal collection of scientific groups has jointly protested a government science or technical program.

Irrespective, the Post notes that nearly half of the Senators have already expressed support for the space station and that Office of Management and Budget director Richard Darman has decried the scientists' antics as being politically naive and representing a severe case of factional cannibalism.

(The Philadelphia Inquirer also ran the Post story in today's editions.)

Los Angeles Times -- 7/9/91

"SCIENCE GROUPS WILL URGE SCUTTLING OF SPACE STATION" By Lee Dye

"Some of the largest and most prestigious scientific organizations in the country will call today for the National Aeronautics and Space Administration to back away from plans to build the Space Station Freedom. The unprecedented action dramatically illustrates the deteriorating support for the costly program."

The Times reports that the organizations are joint forces in the belief that the space station will be so costly that it will undermine financial support for a wide range of other scientific programs.

The paper notes that NASA management has insisted the space station represents the next logical step in exploring the solar system and that these same leaders have shown no sign of weakening.

The article says that some scientists have called the station an unholy alliance of aerospace firms who want a welfare program and empire builders within NASA but notes that some other scientists have said some form of space station is needed but that the current version of the NASA proposal guts all the important science objectives.

Washington Post -- 7/11/91

"SPACE STATION FUNDS CLEARED BY SENATE UNIT" By Eric Pianin

"A Senate Appropriations subcommittee, rebuffing strong opposition from the scientific community, voted yesterday to approve \$2.02 billion -- the full amount requested by the Bush administration -- to continue the space station project another year."

The story says the senators came up with most of the money by cutting the proposed spending on housing for the elderly and that the unanimous vote was a marked contrast to the situation in the House of Representatives last month when that group of congressional representatives voted to kill the space station outright.

The story quotes Senator Barbara Mikulski (D-MD) as saying "there are those who say the space station will cannibalize other science programs, but that's not true."

The story says that Mikulski and Senator Jake Garn (R-UT), ranking Republican on the subcommittee, both agreed that the bill the Senate passed strikes a proper balance between the needs of the National Aeronautics and Space Administration and other agencies covered by the bill.

Addendum to minutes: EWG Conference Information

EWG CONF. PRE-REGISTRATION

Dear Advanced Programmers,

I wanted to advise you to register for the Symposium in advance of receipt of the final program and registration brochure. This will ensure you have a reservation and will hopefully allow us to avoid a last minute barrage of paperwork.

NASA Civil servants should call Jane Kremer at the JSC Human Resources Development Office. Her number is FTS 525-2601. You will be asked about the meal plan and, should you decide to participate (there's not much else out that way), you'll need to return your registration form when you receive it.

Contractors and other government personnel should contact the University of Houston/Clear Lake and ask for Pattie Vining. Her number is (713) 282-2223. She can pre-register you and then send in your registration and payment with the conference form.

If you did not receive the announcement flyer for the symposium and thus are probably not on distribution for the registration package, call Carla Armstrong at FTS 525-9071 or (713) 483-9071.

Hotel reservations are made directly with South Shore Harbour. That number is (713) 334-1000. Be sure and mention you are with the Symposium to get the preferred rate.

Space Station Utilization Team Weekly Meeting Minutes
For additions or changes to this list, contact Randy Cassingham

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Aster, Bob	311	601-237	4-1369	RAster	
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Glazer, Stu	HQ	Code SN	8-???-????		
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Handley, Tom	366	301-440 ✓	4-7009	THandley	THandley
Hansen, Bert	347	198-219 ✓	4-6092	BHansen	BHansen
Hartsough, Chris	367	301-350 ✓	4-1498	CHartsough	
Hendrickson, James	354	157-410	4-3458		
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Houseman, John	385	67-201	4-1601		
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Ivie, Chuck	311	601-237	4-6045	CIvie	
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Kern, Dennis	521	301-456	4-3158		
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Kossmann, William	120	Reston	8-457-7207		
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Laskin, Bob	343	198-326	4-5086	RALaskin	
Lattu, Kristan	374	179-206 ✓	4-2499	KLattu	
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Lewis, Donald W.	797	183-801	4-0840		
Mahoney, Bill	328	169-327	4-6606	WAMahoney	
Martin, Benn	780	264-648 ✓	4-8263	Benn	NSCAT
Masline, Richard	366	301-440 ✓	4-4889	RMasline	
Mattingly, Richard	313	233-302 ✓	4-4605	RMattingly	
Maund, Don	311	2158 LaJolla Dr,	Stockton, CA 95204	MHumfreville	
Merrill, Orin	120	Reston	8-457-7223		
Millard, Jerry	354	89-1	4-2898		
Muirhead, Brian	352	158-224	4-8179	BMuirhead	
Murphy, Gerald	521	301-460	4-9598		
Nishioka, Ken	381	168-227 ✓	4-7674		
Oleson, Gary	120	Reston	8-457-7590		
O'Donnell, Timothy	355	125-112	4-5465		

	Sec	Mall Stop	Phone	NASAmail	TELEmail
Paul, Lori	311	601-237	4-1166	LPaul	
Pomphrey, Rick	366	100-22 ✓	584-2964	RPomphrey	
Pravdo, Steve	381	168-222 ✓	4-3131	SPravdo	
Rayman, Marc	312	301-170K ✓	4-2544	MRayman	
Reiz, Julie	640	512-110	7-7664		
Rosenberg, Leigh	311	601-237	4-1251	LRosenberg	
Schober, Wayne	881	180-603	4-8581	WSchober	
Shao, Mike	385	169-214	4-7834		
Shishko, Bob	311	601-237	4-1282		
Simmons, Larry	790	233-208 ✓	4-6336	LSimmons	
Smith, Jeff H.	311	601-237	4-1236	JHSmith	JHSmith
Smith, Jeff L.	311	601-237	4-1064	JLSmith	
Stachle, Rob	311	601-237	4-1176	RStachle	
Steele, Laura	311	601-237	4-1284	LCrary	
Starsman, Ray	120	Reston	8-457-7226	RStarsman	
Tai, Wallace	317	301-235	4-7561		
Taylor, William	HQ	Code M-8 ✓	8-453-2961	WWTaylor	
Tsou, Peter	???	183-501	4-8094		
Urban, Mike	120	Reston ✓	8-457-7591	MUrban	
Varsi, Giulio	880	180-603	4-2992	Varsi	
Volkmer, Kent	311	171-258 ✓	4-1240	Volkmer	
Von Gronefeld, Peter	120	Reston	8-457-7649	PVonGronefeld	
Vuolo, Bob	120	Reston	8-457-7587	RVuolo	
Wada, Ben	354	157-507	4-3600		
Webb, Allan	120	Reston ✓	8-457-7589	AWebb	
White, Robert H.	784	233-200	4-6786	RHWhite	
Werntz, David	311	601-237	4-1270		
Wiener, Paul	310	301-230 ✓	4-5748		
Wright, Frank	740	180-335	4-5690	FWright	FWright
Zygielbaum, Art	750	180-701	4-3564	AZygielbaum	

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